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INFLUENCES ON TRAFFIC ACCIDENT FREQUENCY AND SEVERITY

THE MEDIA AND POLICE ENFORCEMENT CAMPAIGNS

DRIVER CHARACTERISTICS AND ACCIDENTS

CAUSES AND LOCATIONS OF TRAFFIC ACCIDENTS

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February, 1986.

NOTE

The views expressed in this publication are entirely those of the writer and do not necessarily represent the views or policies of the Ministry of Attorney General or the Province of British Columbia.

OTHER COUNTERATTACK PUBLICATIONS

CounterAttack Traffic Research Papers, 1984, Ministry of Attorney General, British Columbia, 1985

This is a collection of eighteen research papers on traffic-related issues completed by the CounterAttack Program during 1984. Topics covered include: the CounterAttack Program history and evaluation; a discussion of the measurement of "alcohol involvement"; public opinion and knowledge of drinking-driving; the relationship between drivers's age and the causes of traffic accidents; the characteristics of victims of traffic accidents such as age, gender, and position in vehicle; the locations and causes of traffic accidents; the success of roadcheck enforcement "blitzes"; and epidemiological studies of restraint device use and vehicle occupant age. 207 pp. (See also Appendix A herein.)

Alcohol-Related Casualty Traffic Accidents in British Columbia, Ministry of Attorney General, British Columbia, 1984.

This document is a collection of studies which examined the characteristics of alcohol-related casualty traffic accidents in terms of their costs, causes, trends, locations, circumstances, and driver age and experience. 116 pp.

Driving While Impaired: Drivers, Charges and Outcomes, Ministry of Attorney General, British Columbia, 1983.

This study examined the court and driving records of 1,531 drivers charged with Driving While Impaired under the Canadian Criminal Code. These drivers were examined in terms of their demographic characteristics, past driving histories, method of apprehension, Blood Alcohol Content (BAC) at the time of arrest, and the outcome of their court appearances. In addition, their demographic and BAC characteristics were compared to those of a representative sample of drivers in British Columbia in order to assess any differences between those persons driving while impaired and those apprehended for same. 49 pp.

The Characteristics of Night-Time Drivers in British Columbia, Ministry of Attorney General, British Columbia, 1982.

This study examined the demographic characteristics, seat belt use and Blood Alcohol Content (BAC) of a representative sample of night-time drivers in B.C. 54 pp.

These publications are available by writing:

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FOREWORD

This document is a collection of selected papers produced by the CounterAttack Program, most of which have been previously distributed on a limited basis. They have been selected for inclusion not only because they represent the sort of work done by CounterAttack research, but also because they address topics which have been of general interest not only to traffic safety researchers, but also to the police, policy makers, and the public. While each paper is complete unto itself, they have been organized into the following broad categories:

INFLUENCES ON TRAFFIC ACCIDENT FREQUENCY AND SEVERITY

THE MEDIA AND POLICE ENFORCEMENT CAMPAIGNS

DRIVER CHARACTERISTICS AND ACCIDENTS

CAUSES AND LOCATIONS OF TRAFFIC ACCIDENTS

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EXECUTIVE SUMMARIES

INFLUENCES ON PASSENGER VEHICLE CASUALTY ACCIDENTS: UNEMPLOYMENT, DRIVER GENDER, DRIVER AGE, DRINKING DRIVING AND RESTRAINT DEVICE USE

The results of this study of monthly casualty accident data between January 1978 and December 1984 in British Columbia suggest the following:

1. Both the severity of traffic accidents, as measured by the percentage of fatal injuries, and the frequency of casualty accidents per million driven kilometers have been decreasing over the time period in question.

2. Some portion of this change can be attributed to increases in unemployment, which appear to remove young male drivers from the driving population. This in turn arguably decreases the number of drinking drivers and increases restraint device use in the driving population, which in turn both produce decreases in accident frequency and severity.

3. Changes in employment levels produce stronger effects on accident frequency than on accident severity.

4. Over the time period in question, restraint device use in B.C. increased. However, the relationship between this increase and decreases in either the severity of passenger vehicle casualty traffic accidents or the frequency of these accidents per million driven kilometers can be explained by increases in the unemployment variables in conjunction with changes in the driver demographic variables of driver age and driver gender.

5. Over the time period in question, the percentage of alcohol-related casualty traffic accidents in B.C. decreased. However, the relationship between this decrease and decreases in the frequency of passenger vehicle casualty traffic accidents per million driven kilometers can be explained by increases in the unemployment variables in conjunction with changes in the driver demographic variables of driver age and driver gender. On the other hand, controlling for the effects of changes in the unemployment and driver demographic variables, there was a statistically significant relationship between these decreases and decreases in the severity of passenger vehicle casualty traffic accidents as measured by the percentage of fatal injuries.

However, it must be noted that, while on balance changes in unemployment levels which arguably produce changes in driver demographics appear to be related more strongly to changes in casualty traffic accident frequency and severity than are changes in driver behaviour concerning drinking driving and restraint device use, it must be emphasized that the results of this study are based on very rough measures (i.e. monthly averages) and that the majority of the variance in the accident frequency and severity variables has not been explained by the suggested model. In short, these

analyses suggest a pattern but can not be taken as firm conclusions. Nonetheless, the results of this study clearly show that changes in traffic accident figures must be considered within the context of economic trends and driver demographics in addition to the dimensions of in-vehicle behaviour such as restraint device use and drinking-driving.

THE MEDIA AND POLICE ENFORCEMENT CAMPAIGNS

The Relationships among Driving While Impaired Charges, Police Drinking Driving Roadcheck Activity, Media Coverage and Alcohol-Related Traffic Accidents

A correlational examination of 54 consecutive months of data from British Columbia on the relationships among the number of vehicles checked in police drinking-driving roadchecks, the number of Driving While Impaired (DWI) charges laid, the number and percent of alcohol-related casualty traffic accidents, and the extent of media coverage on drinking-driving (as measured by print media coverage), revealed that: the extent of media coverage, and not the extent of roadchecks or charging activity is probably the critical element in the reduction of drinking-driving accidents. The failure of the minimally publicized April-May 1984 British Columbia police roadcheck "blitz" to reduce either the number or proportion of alcohol-related casualty traffic accidents lent support to these correlational findings.

Print Media Content and Drinking-Driving Accidents, British Columbia, 1980-1984

This examination of print media in British Columbia from 1980-1984 shows that monthly increases in the number of articles on drinking driving related to decreases in the monthly percentage of alcohol-related casualty traffic accidents. This can in part be explained by the third variable of the December CounterAttack roadcheck enforcement blitzes. When drinking-driving blitzes occur, they generate a large number of press articles that are blitz-specific, as well as a large number that are on drinking driving in general. Arguably, these articles increase drivers' perception of both the general dangers of drinking driving, as well as the specific threat of an increased probability of apprehension for drinking driving. Consequently there is less drinking driving and fewer alcohol-related traffic accidents.

On the other hand, the monthly proportion of print article content or monthly proportion of groups mentioned in drinking-driving articles failed to predict any monthly reduction in alcohol-related casualty traffic accidents. One possible explanation for this finding could be that, in a broader sense, there is very little difference between one press article on drinking driving and another. That is, all of the articles condemn drinking driving and are therefore all essentially the same message, so it really does not matter to the reader to which specific group the message is attributed. Similarly, the article content codes for this study may be measuring differences that are too subtle to be meaningful or produce

varying effects on the readers of the articles.

Finally, the overall trend of an increase in print articles on drinking driving and a decrease in the percentage of alcohol-related traffic accidents suggests that public attitude may be becoming less accepting of drinking driving, and consequently there are fewer drinking drivers on the roads. Perhaps with continued enforcement and public education, these attitude changes can be maintained to produce a long-lasting reduction in drinking-driving accidents.

The Kamloops Experiment: Media Amplification of a 2-week Drinking-Driving Police Roadcheck Enforcement Campaign in a British Columbia Community

In order for a police enforcement campaign to be effective in affecting drivers' behaviour, it is reasonable to assume that drivers must be made aware of the campaign. Police visibility and the laying of charges, while necessary for the campaign to exist at all, has not been sufficient to make the public aware of same. An attempt at media saturation and community involvement in the Kamloops area of British Columbia in publicizing a two-week, province-wide drinking-driving roadcheck police enforcement campaign brought the awareness of the campaign up to 51% in the Kamloops area, as opposed to an awareness level of only 16% in the remainder of the province. The total media cost for the Kamloops area was about $7,000, or perhaps 65% of the insurance costs of a single, injury-producing traffic accident. It consisted of paid radio and newspaper messages, and of supplying the community with posters and lapel stickers. In order to coordinate the publicity associated with the Kamloops area campaign, the Kamloops Steering Committee, representing a wide range of community groups was also formed.

The results of this study clearly show that paid media messages combined with community support constitute an effective method of making the public aware of a police drinking-driving enforcement campaign, and that the lack of paid media amplification of the police campaign will result in the public not being aware of the campaign. This, in turn, will probably result in the failure of the campaign to change the public's driving behaviours and thus there will probably be no reduction in associated traffic accidents.

In short, the simple fact of police presence and the unassisted media interest generated by same are not enough to make the public aware of a drinking-driving roadcheck enforcement campaign. Paid advertisement, preferably in conjunction with local community support, is necessary in addition to police efforts.

The Effects of Media Amplification of Police Presence in a 2-week Intersection Enforcement Campaign

The results of this study indicate that the newspaper and radio media campaign carried out by the Victoria Area police to publicize their two-week intersection enforcement campaign was effective in conveying the fact of the campaign to the public, substantially reducing intersection violations, and in changing the nature of the violations that did occur. Had the Victoria Area enforcement campaign proceeded without the media campaign, it would have produced five times the number of charges at an

estimated additional cost of $44,000.00 in justice system and administrative expenses. As the cost of the media campaign did not approach 1% of these estimated savings, it follows that extensive use of the media to publicize and amplify police enforcement efforts can be a cost-effective method of, at least for a short period, reducing the frequency of driving violations without substantially increasing justice system costs.

DRIVERS' CHARACTERISTICS AND ACCIDENTS

Convicted Drinking Drivers: Sex, Age, Other Traffic Convictions and Traffic Accidents. British Columbia, June 1980 - December 1984

In sum, the results of these analyses suggest that the situation is one of the impaired problem driver as opposed to the impaired driver problem. That is, when compared to drivers who have not been convicted of Driving While Impaired, those convicted of DWI have had about twice as many other driving-related convictions and over twice the number of reported traffic accidents. On the whole, convicted drinking drivers appear to be relatively dangerous drivers who also consume alcohol. From this it follows that drinking driving countermeasures might be best associated with a broad spectrum of driver training and education that includes, but is not limited to, information on alcohol.

Five Driver Licence Categories: Drivers' Age, Traffic Convictions and Traffic Accidents. British Columbia, June 1980 - December 1984

Professional drivers (i.e. Licence Classes 1-4) showed a substantially higher traffic conviction rate and traffic accident rate than did non-professionals (i.e. Licence Class 5.) However, if one were to assume that professional drivers had four times the driving exposure of non-professionals, then in all likelihood they are substantially better drivers per driven mile than are non-professionals.

Age v.s. Driving Experience as Predictors of Young Driver's Traffic Accident Involvement

In sum, the tendency for young drivers to be involved in a disproportionately high number of traffic accidents can not be explained by simply age or by driving experience, and may well be more psychologically determined. Unfortunately, if this is the case, countermeasures that are fair and equitable to all members of an age or experience group would be very difficult to legislate.

Casualty Accidents Involving Vehicles Registered Out-of-Province, British Columbia, 1984

In addition to general driving experience, familiarity with the general driving environment and specific route taken are important factors in avoiding traffic accidents. The driving environment of British Columbia

can be characterized as being comprised of winding mountain roads with little run-off area and of densely packed urban centers. Arguably, both of these sorts of environments draw out-of-province visitors because of their novelty to the visitor, yet this same novelty makes the driving environment a more dangerous one for the visitor than for the local resident.

The results of this study show that, when compared to B.C. registered vehicles in casualty traffic accidents, out-of-province vehicles are involved in a higher proportion of accidents, accidents occurring on any day of the week (as opposed to primarily during the week-end), accidents occurring in the Summer months, and accidents not involving alcohol. From this, one gets the picture of a tourist on summer holiday travelling during the day. However, the relatively high proportion of out-of-province drivers in fatal accidents driving commercial vehicles and the relatively high proportion of out-of-province drivers in hit-and-run casualty accidents warrants some concern.

CAUSES AND LOCATIONS OF TRAFFIC ACCIDENTS

Casualty Traffic Accident Causes by Police Reporting Area, British Columbia, 1984

This is a tabular presentation of some of the primary causes of casualty traffic accidents broken down by police reporting detachments.

Casualty Traffic Accident Locations by Police Reporting Area, British Columbia, 1984

This is a tabular presentation of the locations of casualty traffic accidents (e.g. intersection, bridge) broken down by police reporting detachments.

SECTION 1

INFLUENCES ON TRAFFIC ACCIDENT FREQUENCY AND SEVERITY

Influences on Passenger Vehicle Casualty Accidents:
Unemployment, Driver Gender, Driver Age, Drinking Driving
and Restraint Device Use.
British Columbia, 1977 to 1984

Influences on Passenger Vehicle Casualty Accidents: Unemployment, Driver Gender, Driver Age, Drinking Driving and Restraint Device Use. British Columbia, 1977 to 1984

SUMMARY

The results of this study of monthly casualty accident data between January 1978 and December 1984 in British Columbia suggest the following:

1. Both the severity of traffic accidents, as measured by the percentage of fatal injuries, and the frequency of casualty accidents per million driven kilometers have been decreasing over the time period in question.

2. Some portion of this change can be attributed to increases in unemployment, which appear to remove young male drivers from the driving population. This in turn arguably decreases the number of drinking drivers and increases restraint device use in the driving population, which in turn both produce decreases in accident frequency and severity.

3. Changes in employment levels produce stronger effects on accident frequency than on accident severity.

4. Over the time period in question, restraint device use in B.C. increased. However, the relationship between this increase and decreases in either the severity of passenger vehicle casualty traffic accidents or the frequency of these accidents per million driven kilometers can be explained by increases in the unemployment variables in conjunction with changes in the driver demographic variables of driver age and driver gender.

5. Over the time period in question, the percentage of alcohol-related casualty traffic accidents in B.C. decreased. However, the relationship between this decrease and decreases in the frequency of passenger vehicle casualty traffic accidents accidents per million driven kilometers can be explained by increases in the unemployment variables in conjunction with changes in the driver demographic variables of driver age and driver gender. On the other hand, controlling for the effects of changes in the unemployment and driver demographic variables, there was a statistically significant relationship between these decreases and decreases in the severity of passenger vehicle casualty traffic accidents as measured by the percentage of fatal injuries.

However, it must be noted that, while on balance changes in unemployment levels which arguably produce changes in driver demographics appear to be related more strongly to changes in casualty traffic accident frequency and severity than are changes in driver behaviour concerning drinking driving and restraint device use, it must be emphasized that the results of this study are based on very rough measures (i.e. monthly averages) and that the majority of the variance in the accident frequency and severity variables has not been explained by the suggested model. In short, these analyses suggest a pattern but can not be taken as firm conclusions. Nonetheless, the results of this study clearly show that changes in traffic accident figures must be considered within the context of economic trends and driver demographics in addition to the dimensions of in-vehicle behaviour such as restraint device use and drinking-driving.

INFLUENCES ON PASSENGER VEHICLE CASUALTY ACCIDENTS: UNEMPLOYMENT, DRIVER GENDER, DRIVER AGE, DRINKING DRIVING AND RESTRAINT DEVICE USE. BRITISH COLUMBIA, 1977 to 1984.

Variations over time in the severity of traffic accidents and the frequency of these accidents per driven kilometer can come from at least two sources: changes in driver behaviour and attitudes, and changes in the demographic composition of the driving population. To elaborate on the former, it is possible that decreases in accident severity and accident frequency per driven kilometer could be attributed to increased restraint device use or to decreased drinking driving by the driving population as a whole. For example, Christian (1984) found that increased restraint device use in Australia led to decreases in traffic injury severity. On the other hand, Jonah and Lawson (1984) found that, while restraint device use increased with legislation requiring the use of same, this did not always produce reductions in fatality and injury rates. By way of explanation they suggested that perhaps it was mainly the safer drivers who obeyed the laws.

Changes in traffic accident severity and frequency could also stem from changes in the demographic characteristics of the driving population. If the group of drivers most likely to be in accidents were proportionally reduced, then one would expect reduction in accidents. One mechanism that could change the demographics of the driving population is unemployment rate, and this factor has been shown to be a strong predictor of accident frequencies by several researchers (Cooper, 1984; Partyka, 1984). To elaborate, overall unemployment increases first affect the younger age

groups. Further, alcohol-related traffic accidents tend to be more severe than other traffic accidents. Assuming that less disposable income in a group would produce less out-of-residence alcohol consumption and less driving, and considering that young drivers tend to be in proportionally more traffic accidents than are older drivers (e.g. Mayhew, 1982), then it follows that increases in unemployment would change the demographics of the driving population by reducing both the proportion of young drivers and the proportion of drinking drivers, thus reducing accident frequency and severity.

It is the purpose of this paper to attempt to develop a conceptual model to assess the relative contribution of changes in restraint device use frequency, alcohol-related traffic accident frequency, and unemployment rates to both the average monthly severity of traffic accidents and to the average monthly frequency of casualty traffic accidents per driven kilometer in British Columbia between 1978 and 1984.

METHOD

Using "month" as the unit of analysis, Zero-order (Pearson's r) and Partial Correlation coefficients were used to assess the relationships among the following variables for the period from January 1978 to December 1984 inclusive (84 months data). It should be mentioned that, while 1977 data was calculated and is presented at a univariate level, it was not used in the bivariate or multivariate analysis due to the steep increase in restraint device use in 1977. This sort of increase will produce an "outlier effect" on the standard deviation of restraint device use and thus make it unsuitable for linear analyses.

In order to both assess in-vehicle safety per driven kilometer and to maximize any effects of restraint device use, only traffic accidents that involved one or more passenger vehicles (as opposed to commercial vehicle only accidents) and that did not involve pedestrians, motorcycles or bicycles were used in these analyses.

PREDICTOR VARIABLES

1. Monthly Average Unemployment Figures: Four measures of monthly, seasonally adjusted average figures for B.C. were taken from the Statisitics Canada CANSIM data base: the percentage of males unemployed who were between 15-24; the percentage of males unemployed who were over 24 years of age; the percentage of females unemployed who were between 15-24; and the percentage of females who were unemployed over 24 years of age.
2. Monthly Average Percentage of Passenger Vehicle Casualty Accidents that were Alcohol-Related: The average percentage of alcohol-related casualty accidents reported in the month, as recorded on the Traffic Accident Report Form (MV104) by the attending police officers were determined. The reason that only casualty accident data was used is that property damage-only accidents are self-reported by the persons involved, do not require a police investigation, and therefore are of questionable validity. On the other hand, accidents resulting in casualties must be investigated by the police. It should be noted that the determination of alcohol-involvement is done by trained investigating traffic police officers using provincially homogeneous forms and techniques, and that the same forms and police training techniques have been in place since 1977. For the purposes of this paper, a

casualty accident was classified as "alcohol involved" if, in the opinion of the investigating officers, alcohol was the single primary cause of the accident. Because the absolute number of alcohol-related accidents will vary from month to month as the total number of accidents varies, and because this absolute number can also be influenced by such factors as the weather, economy and so on, the percentage of alcohol-related casualty accidents can be seen as a superior and more stable measure of the relative prevalence of drinking-driving casualty accidents over the simple number of alcohol-related casualty accidents. In turn, monthly changes in the frequencies of these accidents probably reflects changes in actual drinking-driving rates.

3. Monthly Average Monthly Percentage of Occupants in Passenger Vehicle Casualty Accidents who were using Restraint Devices: This variable was determined from the MV104 reports noted in (1) above. These figures have been found to be reliable estimates of actual restraint device use frequencies in the passenger vehicles, although these casualty accident figures tend reliably to over-estimate restraint device use by 12-15% (Cooper, 1985).

4. Monthly Average Age of Drivers in Passenger Vehicle Casualty Accidents: From the MV104 reports on passenger vehicle casualty accidents, the monthly average age of drivers in these accidents was determined. This variable was used as a reasonable indicator of changes in the average age of the passenger vehicle driving population as a whole.

5. Monthly Average Percentage of Males as Drivers in Passenger Vehicle Casualty Accidents: Again, from the MV104, the percentage of males as drivers in passenger vehicle casualty accidents was used as an indication of changes in the gender composition of the passenger vehicle driving population as a whole.

CRITERION VARIABLES:

1. Monthly Average Casualty Accident Severity: Monthly average casualty accident severity was measured using the proportion (taken as a percentage) of passenger vehicle fatal injuries to all passenger vehicle injuries. The rationale here is that as overall accident severity decreases, the percentage of fatal injuries ought to reflect this by also decreasing.

2. Monthly Average Number of Casualties per Million Driver Kilometers: The monthly average number of casualties in passenger vehicle accidents for the province was taken from the MV104 reports. The number of kilometers driven by passenger vehicles was calculated by first determining the monthly number of litres of clear gasoline (i.e. not "blue" gasoline sold to commercial carriers, for farm machinery etc.) sold per month in British Columbia from the B.C. Ministry of Finance. This figure was then multiplied by the fuel efficiency of the B.C. passenger vehicle fleet, as determined by quarterly studies on passenger car fuel consumption (Statistics Canada). It should be noted that, because figures were not available for 1977-1978, the quarterly fuel efficiency estimates for that period were calculated by projecting the 1984-1978 figures. Finally, the monthly figures for passenger vehicle casualties were divided by the monthly figures for kilometers driven by the passenger vehicle fleet.

ANALYSES

In addition to the above variables, a linear variable "time" was created by assigning January 1978 a value of 1 and increasing the value of each succeeding month by 1 to December 1984, which had the value 84. This was done in order to be used to measure for simple linear changes in these variables from 1978 to 1984

Pearson's correlation coefficients were calculated for each of the relationships among the predictor variables, criterion variables, and "time". In addition, Partial Correlation matrices were calculated to control for the effects of the unemployment variables and for the effects of the unemployment variables and driver demographics variables (i.e. drivers' age and percent male drivers combined.)

RESULTS AND DISCUSSION

Figures 1 to 7 illustrate the monthly average levels of: the predictor and criterion variables from January 1977 to December 1984 for British Columbia. Clearly, there are seasonal variations for each of these variables, as well as changes from year to year. (See also Tables 1 to 16 in Appendix A.)

Zero-Order Correlations:

The simple, zero-order correlations above the diagonal in Table 1 illustrate the complexity of the relationships under consideration. For example, restraint device use significantly predicted reductions in accident severity, but restraint device use and accident severity are both significantly predicted by time, by all four measures of unemployment, by driver age, and by the percentage of alcohol-related accidents. Similarly, while increases in alcohol-related accidents significantly predicted

FIGURE 1

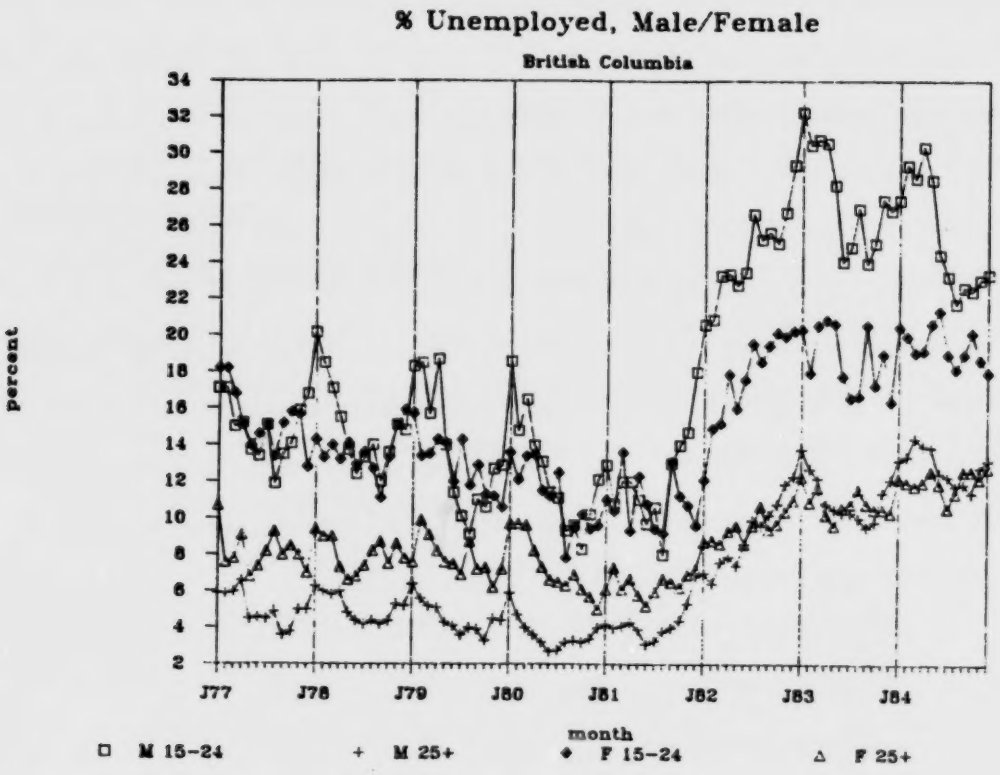
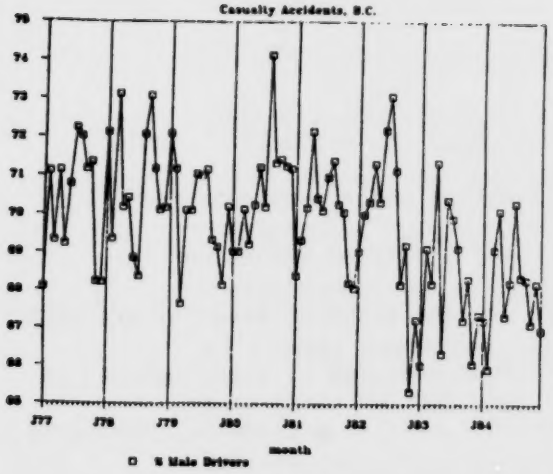


FIGURE 2



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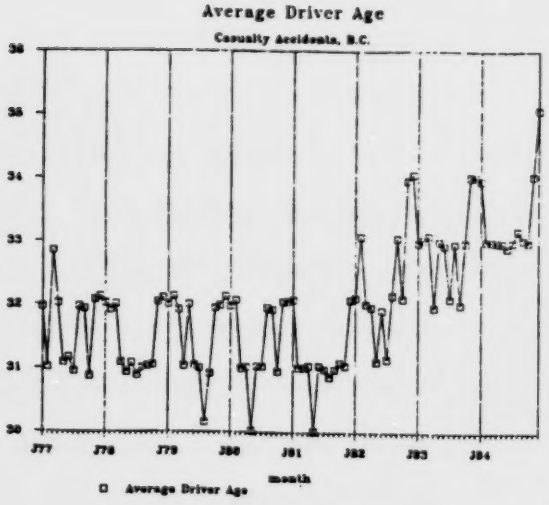

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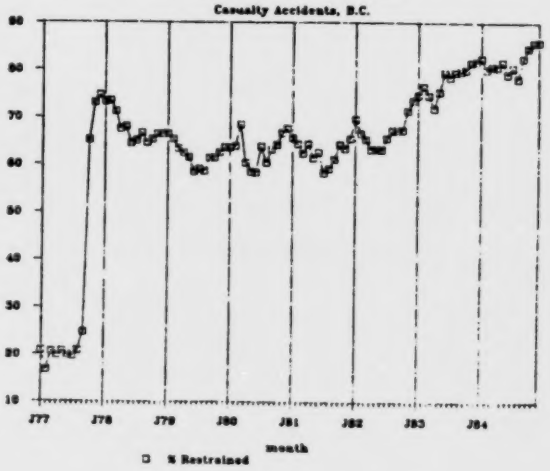

FIGURE 5

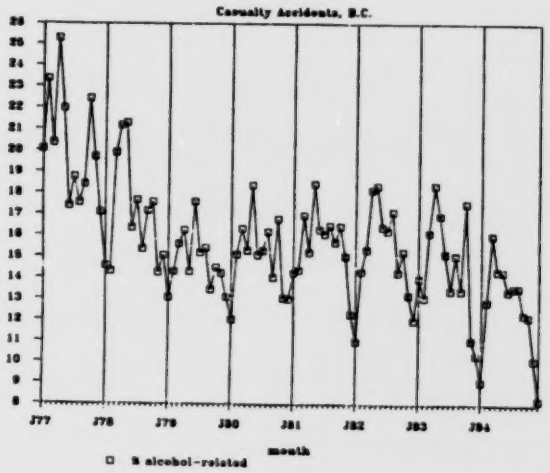

FIGURE 6

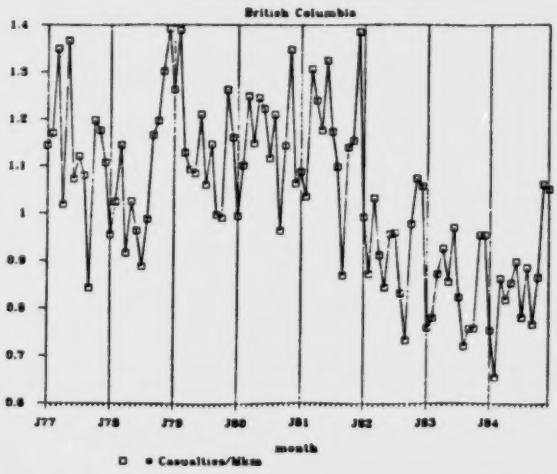

FIGURE 7

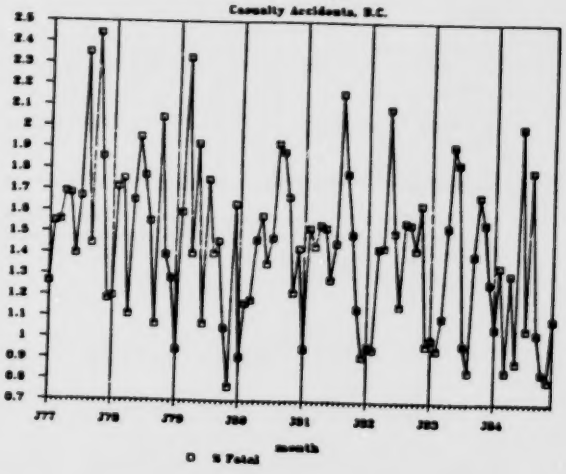

Table 1
Zero Order Correlations (above diagonal)

Variables	TIME	UMA15-24	UMA25	UFE15-24	UFE25	DAGE	%MA	%RES	%ALC	NCAS	%FAT
Time		.71 P=.00	.81 P=.00	.66 P=.00	.67 P=.00	.67 P=.00	-.51 P=.00	.71 P=.00	-.45 P=.00	-.58 P=.00	-.26 P=.01
Unemployed Males 15-24 (UMA1524)			.94 P=.00	.90 P=.00	.86 P=.00	.74 P=.00	-.50 P=.00	.76 P=.00	.29 P=.00	-.67 P=.00	-.28 P=.00
Unemployed Males 25+ (UMA25)				.90 P=.00	.90 P=.00	.82 P=.00	-.56 P=.00	.87 P=.00	-.41 P=.00	-.67 P=.00	-.31 P=.00
Unemployed Females 15-24 (UFE1524)					.85 P=.00	.67 P=.00	-.51 P=.00	.73 P=.00	-.23 P=.02	-.67 P=.00	-.17 P=.06
Unemployed Females 25+ (UFE25)						.74 P=.00	-.50 P=.00	.83 P=.00	-.40 P=.00	-.64 P=.00	-.29 P=.00
Driver Age (DAGE)							-.60 P=.00	.81 P=.00	-.65 P=.00	-.46 P=.00	-.31 P=.00
% Male Drivers (%MA)						*1		-.54 P=.00	.49 P=.00	.40 P=.00	.21 P=.03
% Restrained (%RES)						.32 P=.00	-.13 P=n.s.		-.49 P=.00	-.60 P=.00	-.32 P=.00
% Alcohol-Related (%ALC)		*3				-.57 P=.00	.37 P=.00		*2		
# Casualties per MKm. (NCAS)		-.41 P=.00	-.40 P=.00	-.37 P=.00	-.32 P=.00	.19 P=.05	.04 P=n.s.	-.15 P=n.s.	-.10 P=n.s.		
% Fatal (%FAT)		-.18 P=n.s.	-.13 P=n.s.	.00 P=n.s.	-.07 P=n.s.	-.04 P=n.s.	.06 P=n.s.	-.05 P=n.s.	.28 P=.01		

*1 - Partial Correlations controlling for Unemployment
*2 - Partial Correlations controlling for Unemployment, Drivers' Age, % Male
*3 - Partial Correlations controlling for Drivers' Age, % Male, % Restrained, % Alcohol
n.s. - not significant

increases in accident severity, both show significant decreases over time, with increases in unemployment, decreases with increases in average driver age and so on.

However, perhaps the notion of a "loose causal relationship" (Blalock, 1961) can add order to these data. Arguably, the variables can be catagorized into four groups, with each preceding group in part causing the changes in the following group. The first group is the unemployment variables, the second is the driver demographics variables (i.e. drivers' age, percentage of male drivers), the third group is the in-vehicle driver-attitude related variables (i.e. percentage of alcohol-related, percentage restraint device use) and the final group is the criterion variables of casualties per driven million kilometers and accident severity (i.e. percent fatal injuries). That is, it can be argued that changes in employment levels could change the make-up of the driver population, but it could not easily be argued that changes in the driver population could cause changes in employment levels. Similarly, changes in driver demographics could cause changes in drinking-driving and in restraint device use, while the opposite would be unlikely. Finally, changes in drinking driving and restraint device use could produce changes in accident frequency and severity, but these variables are unlikely to affect changes in driver demographics or in employment levels.

Following the above framework, from the upper diagonal of Table 1 it can be seen that as levels of unemployment increased, the average age of drivers in casualty accidents also increased, and as levels of unemployment increased, the percentage of males as drivers in casualty accidents decreased. Presumably unemployment increases removed young male drivers from the driving population, thus increasing the average driver age and

decreasing the percentage of male drivers. Further, it can be seen that changes in the measure of both drivers' age and drivers' gender related significantly to changes in the restraint device use variable and the drinking-driving variable, which in turn related to changes in both criterion variables. Finally, it should be noted that both the measure of accident severity and accident frequency decreased over "time".

The lower diagonal of Table 1 contains Partial Correlations removing the effects of changes in unemployment on the relationships between: driver age and both percentage of restraint device use and the percentage of alcohol-relted casualty accidents; and between percent male drivers and both percentage of restraint device use and the percentage of alcohol-related casualty accidents. From these it can be seen that, as average driver age in casualty accidents increased, the percentage of alcohol-related casualty accidents decreased and the percentage of occupants in casualty accidents who were wearing restraint devices in casualty accidents increased. Also, it can be seen that, as the percentage of males as drivers in casualty accidents increased, the percentage of occupants in these accidents who were wearing restraint devices was not affected, while as the percentage of male drivers increased, the percentage of alcohol-related casualty accidents also increased. Thus, changes in the variables associated with drivers' age and drivers' gender had effects on variables associated with drinking-driving and with restraint device use that were unique and could not be simply be attributed to changes in unemployment levels.

The lower diagonal of Table 1 also illustrates the Partial Correlations controlling for unemployment, drivers' age, and percent of male drivers for the relationships between: percent restraint device use

and both accident severity (i.e. % fatal injuries) and the number of casualties per million driven kilometers; and between the percentage of alcohol-related casualty accidents and these two criterion variables. It can be seen that, after removing the effects of the unemployment and driver demographic variables, there was no statistically significant relationship between changes in restraint device use and either the measure of accident severity or the measure of accident frequency. It can also be seen that, after removing the effects of unemployment, drivers' age, and drivers' gender, there was a statistically significant relationship between changes in alcohol-related casualty accidents and changes in the percentage of fatal casualties, but there was not a statistically significant relationship between changes in the percentage of alcohol-related casualty accidents and the measure of accident frequency.

Finally, again from the lower diagonal of Table 1, it can be seen that, controlling for the effects of drivers' age, drivers' gender, alcohol-related accidents, and restraint device use, increases in all four unemployment measures significantly predicted decreases in accident frequency by distance driven, but failed to significantly predict changes in the measure of accident severity.

CONCLUSIONS:

The results of this study of monthly casualty accident data between January 1978 and December 1984 in British Columbia suggest the following:

1. Both the severity of traffic accidents, as measured by the percentage of fatal injuries, and the frequency of casualty accidents per million driven kilometers have been decreasing over the time period in question.

2. Some portion of this change can be attributed to increases in unemployment, which appear to remove young male drivers from the driving population. This in turn arguably decreases the number of drinking drivers and increases restraint device use in the driving population, which in turn both produce decreases in accident frequency and severity.

3. Changes in employment levels produce stronger effects on accident frequency than on accident severity.

4. Over the time period in question, restraint device use in B.C. increased. However, the relationship between this increase and decreases in either the severity of passenger vehicle casualty traffic accidents or the frequency of these accidents per million driven kilometers can be explained by increases in the unemployment variables in conjunction with changes in the driver demographic variables of driver age and driver gender.

5. Over the time period in question, the percentage of alcohol-related casualty traffic accidents in B.C. decreased. However, the relationship between this decrease and decreases in the frequency of passenger vehicle casualty traffic accidents accidents per million driven kilometers can be explained by increases in the unemployment variables in conjunction with changes in the driver demographic variables of driver age and driver gender. On the other hand, controlling for the effects of changes in the unemployment and driver

demographic variables, there was a statistically significant relationship between these decreases and decreases in the severity of passenger vehicle casualty traffic accidents as measured by the percentage of fatal injuries.

However, it must be noted that, while on balance changes in unemployment levels which arguably produce changes in driver demographics appear to be related more strongly to changes in casualty traffic accident frequency and severity than are changes in driver behaviour concerning drinking driving and restraint device use, it must be emphasized that the results of this study are based on very rough measures (i.e. monthly averages) and that the majority of the variance in the accident frequency and severity variables has not been explained by the suggested model. In short, these analyses suggest a pattern but can not be taken as firm conclusions. Nonetheless, the results of this study clearly show that changes in traffic accident figures must be considered within the context of economic trends and driver demographics in addition to the dimensions of in-vehicle behaviour such as restraint device use and drinking-driving.

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APPENDIX A

Monthly Data, Passenger Vehicle Traffic Accidents, Excluding Pedestrian, Motorcycle, and Bicycle Accidents

British Columbia, January 1977 to December 1984

Table 1
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1977

Month	# killed	#injured	liters clear gas (thou.)	km. conversion factor*	km. driven (MIL)	deaths/ 100 thou. km.	injuries/ 100 thou. km.	% Unemployment, B.C. Males 15-24	Males 25+	Females 15-24	Females 25+
Jan.	23	1,795	286046	18.0	1589	0.15	11	17.1%	5.9%	18.2%	10.7%
Feb.	25	1,590	248486	18.0	1380	0.18	12	17.1%	5.9%	18.2%	7.6%
March	29	1,835	248535	18.0	1381	0.21	13	15.0%	6.9%	16.8%	7.8%
April	31	1,805	288326	16.0	1802	0.17	10	15.2%	6.6%	16.1%	9.1%
May	39	2,282	271601	16.0	1698	0.23	13	13.7%	4.5%	14.0%	6.8%
June	28	1,977	298981	16.0	1869	0.15	11	13.4%	4.6%	14.6%	7.4%
July	39	2,301	313008	15.0	2087	0.19	11	15.1%	4.5%	15.1%	8.2%
Aug.	56	2,326	330558	15.0	2204	0.25	11	11.9%	4.9%	13.4%	9.3%
Sep.	30	2,046	368929	15.0	2460	0.12	8	13.5%	3.6%	15.2%	8.0%
Oct.	53	2,117	307953	17.0	1811	0.29	12	14.1%	3.8%	15.8%	8.5%
Nov.	38	2,009	295764	17.0	1740	0.22	12	15.9%	5.0%	15.7%	8.0%
Dec.	23	1,919	297862	17.0	1752	0.13	11	16.8%	5.0%	12.8%	7.0%
YEAR	414	24,002	3557 mil.	16.5	21,773	0.19	11	14.9%	5.3%	15.4%	8.2%

* liters / 100 km.

Table 2
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1978

Month	# killed	#injured	liters clear gas (thou.)	km. conversion factor*	km. driven (MIL.)	deaths/ 100 thou. km.	injuries/ 100 thou. km.	% Unemployment, B.C. Males 15-24	Males 25+	Females 15-24	Females 25+
Jan.	19	1,568	288449	17.4	1658	0.12	9	20.2%	6.3%	14.3%	9.4%
Feb.	27	1,548	266838	17.4	1534	0.18	10	18.5%	6.0%	13.3%	9.0%
March	30	1,683	259974	17.4	1494	0.20	11	17.1%	5.8%	14.0%	9.0%
April	20	1,780	305625	15.6	1959	0.10	9	15.5%	6.0%	13.2%	7.3%
May	34	2,027	312753	15.6	2005	0.17	10	13.7%	4.8%	14.1%	6.6%
June	40	2,012	331349	15.6	2124	0.19	9	12.4%	4.4%	12.9%	6.8%
July	38	2,113	354733	14.7	2413	0.16	9	13.3%	4.2%	13.6%	7.4%
Aug.	39	2,478	373548	14.7	2541	0.15	10	14.0%	4.4%	12.7%	8.2%
Sep.	27	2,506	318839	14.7	2169	0.12	12	12.0%	4.2%	11.1%	8.7%
Oct.	48	2,304	323928	16.5	1963	0.25	12	13.6%	4.4%	13.3%	7.5%
Nov.	35	2,484	319055	16.5	1934	0.18	13	15.1%	5.3%	15.1%	8.6%
Dec.	33	2,545	305656	16.5	1852	0.18	14	14.8%	5.2%	15.9%	7.8%
YEAR	390	25,048	3762 mil.	16.1	23,646	0.17	11	15.0%	5.1%	13.6%	8.0%

* liters / 100 km.

Table 3
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1979

Month	# killed	#injured	liters clear gas (thou.)	km. conversion factor*	km. driven (thou.)	deaths/ 100 thou. km.	injuries/ 100 thou. km.	% Unemployment, B.C.			
								Males		Females	
								15-24	25+	15-24	25+
Jan.	21	2,203	293749	16.7	1759	0.12	13	18.3%	6.4%	15.7%	7.6%
Feb.	36	2,228	272245	16.7	1630	0.22	14	18.5%	5.6%	13.4%	9.9%
March	45	1,890	285817	16.7	1711	0.26	11	15.7%	5.2%	13.5%	9.1%
April	30	2,123	296935	15.1	1966	0.15	11	18.7%	5.1%	14.3%	8.2%
May	41	2,101	297428	15.1	1970	0.21	11	14.0%	4.3%	14.1%	7.6%
June	27	2,506	315972	15.1	2093	0.13	12	11.4%	4.1%	12.0%	7.5%
July	45	2,532	351439	14.5	2424	0.19	10	10.1%	3.6%	14.3%	6.9%
Aug.	37	2,616	334970	14.5	2310	0.16	11	9.1%	4.0%	11.8%	8.7%
Sep.	38	2,574	378957	14.5	2613	0.15	10	11.0%	3.9%	12.9%	7.2%
Oct.	27	2,557	408280	15.7	2601	0.10	10	10.6%	3.3%	11.3%	7.3%
Nov.	20	2,590	324346	15.7	2065	0.10	13	12.7%	4.5%	11.2%	6.2%
Dec.	44	2,651	364074	15.7	2318	0.19	11	12.9%	4.4%	10.6%	7.2%
YEAR	411	28,571	3923 mil.	15.5	25,460	0.17	11	13.6%	4.5%	12.9%	7.8%

* liters / 100 km.

Table 4
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1980

Month	# killed	#injured	liters clear gas (thou.)	km. conversion factor*	km. driven (MIL.)	deaths/ 100 thou. km.	injuries/ 100 thou. km.	% Unemployment, B.C.			
								Males		Females	
								15-24	25+	15-24	25+
Jan.	18	1,969	326704	16.4	1992	0.09	10	18.6%	5.9%	13.6%	9.7%
Feb.	25	2,132	320507	16.4	1954	0.13	11	14.8%	4.7%	12.1%	9.7%
March	27	2,271	301427	16.4	1838	0.15	12	16.5%	4.0%	13.4%	9.6%
April	34	2,291	301315	14.9	2022	0.17	11	14.0%	3.6%	13.5%	8.2%
May	41	2,557	310445	14.9	2084	0.20	12	13.1%	3.2%	11.5%	7.3%
June	37	2,706	333976	14.9	2241	0.17	12	11.4%	2.7%	11.2%	6.6%
July	41	2,739	350351	14.1	2485	0.17	11	11.1%	2.8%	12.5%	6.5%
Aug.	58	2,962	351527	14.1	2493	0.23	12	9.3%	3.2%	7.8%	6.3%
Sep.	52	2,710	403250	14.1	2860	0.18	9	9.6%	3.3%	9.5%	6.9%
Oct.	48	2,827	396917	15.8	2512	0.19	11	8.3%	3.2%	10.2%	6.1%
Nov.	39	3,176	376933	15.8	2386	0.16	13	10.2%	3.4%	9.4%	5.7%
Dec.	36	2,490	374676	15.8	2371	0.15	11	12.1%	4.0%	9.6%	5.0%
YEAR	456	30,830	4147 mil.	15.3	27,238	0.17	11	12.4%	3.7%	11.2%	7.3%

* liters / 100 km.

Table 5
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1981

Month	# killed	#injured	liters clear gas (thou.)	km. conversion factor*	km. driven (MIL.)	deaths/ 100 thou. km.	injuries/ 100 thou. km.	% Unemployment, B.C.			
								Males		Females	
								15-24	25+	15-24	25+
Jan.	22	2,301	319643	15.0	2131	0.10	11	12.9%	4.2%	11.0%	6.1%
Feb.	37	2,392	351206	15.0	2341	0.16	10	10.8%	4.0%	10.4%	7.3%
March	38	2,608	303837	15.0	2025	0.19	13	12.0%	4.1%	13.6%	6.1%
April	41	2,621	298413	13.9	2147	0.19	12	12.0%	4.3%	9.3%	6.7%
May	46	2,968	356082	13.9	2562	0.18	12	11.0%	3.9%	12.3%	5.8%
June	41	3,165	336527	13.9	2421	0.17	13	7.9%	3.1%	10.8%	5.2%
July	44	2,984	348150	13.5	2579	0.17	12	10.6%	3.3%	9.4%	6.0%
Aug.	64	2,900	363828	13.5	2695	0.24	11	8.0%	3.8%	9.2%	6.7%
Sep.	47	2,589	408668	13.5	3027	0.16	9	13.0%	4.0%	13.1%	6.5%
Oct.	43	2,832	390743	15.5	2521	0.17	11	14.0%	4.4%	11.2%	6.2%
Nov.	31	2,685	364625	15.5	2352	0.13	11	14.7%	5.3%	10.7%	6.9%
Dec.	28	3,036	343064	15.5	2213	0.13	14	18.0%	6.8%	9.6%	7.2%
YEAR	482	33,081	4184 mil.	14.5	29,041	0.17	12	12.2%	4.3%	10.9%	6.4%

*liters / 100 km.

Table 6
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1982

Month	# killed	#injured	liters clear gas (thou.)	km. conversion factor*	km. driven (MIL.)	deaths/ 100 thou. km.	injuries/ 100 thou. km.	% Unemployment, B.C.			
								Males		Females	
								15-24	25+	15-24	25+
Jan.	20	2,055	317578	15.2	2089	0.10	10	20.6%	7.0%	12.1%	8.7%
Feb.	19	1,984	348452	15.2	2292	0.08	9	20.9%	6.4%	14.9%	8.8%
March	26	1,795	267782	15.2	1762	0.15	10	23.3%	7.6%	15.2%	8.6%
April	27	1,855	286458	13.9	2061	0113	9	23.4%	7.9%	17.9%	9.3%
May	41	1,922	323032	13.9	2324	0.18	8	22.8%	7.4%	16.0%	9.6%
June	32	2,094	308557	13.9	2220	0.14	9	23.5%	8.6%	17.6%	8.6%
July	29	2,225	311766	13.3	2344	0.11	9	26.7%	9.9%	19.6%	9.6%
Aug.	33	2,090	339235	13.3	2551	0.13	8	25.3%	9.6%	18.6%	10.7%
Sep.	30	1,913	352598	13.3	2651	0.11	7	25.7%	10.2%	19.5%	9.4%
Oct.	34	2,356	368376	15.1	2440	0.14	10	25.1%	10.8%	20.2%	9.7%
Nov.	38	2,284	325812	15.1	2158	0.18	11	26.8%	11.9%	20.0%	10.4%
Dec.	21	2,143	308308	15.1	2042	0.10	10	29.4%	12.3%	20.3%	11.0%
MEAN	347	24,716	3857 mil.	14.4	26,934	0.13	9	24.5%	9.1%	17.7%	9.5%

* liters / 100 km.

Table 7
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1983

Month	# killed	#injured	liters clear gas (thou.)	km. conversion factor*	km. driven (MIL.)	deaths/ 100 thou. km.	injuries/ 100 thou. km.	% Unemployment, B.C.			
								Males		Females	
								15-24	25+	15-24	25+
Jan.	17	1,682	306591	13.7	2238	0.08	8	32.3%	13.8%	20.4%	12.3%
Feb.	17	1,772	314177	13.7	2293	0.07	8	30.5%	12.7%	18.0%	10.9%
March	18	1,615	256011	13.7	1869	0.10	9	30.8%	12.2%	20.6%	11.7%
April	28	1,801	268066	13.6	1971	0.14	9	30.6%	10.8%	20.9%	10.2%
May	36	1,844	298414	13.6	2194	0.16	8	28.3%	10.5%	20.7%	9.6%
June	36	1,930	275053	13.6	2022	0.18	10	24.1%	10.3%	17.8%	10.6%
July	19	1,933	309981	13.1	2367	0.08	8	24.9%	10.3%	16.6%	10.8%
Aug.	15	1,753	321525	13.1	2454	0.06	7	27.0%	10.0%	16.7%	11.6%
Sep.	27	1,901	333137	13.1	2543	0.11	7	24.0%	9.5%	20.6%	10.8%
Oct.	34	1,991	363027	13.6	2669	0.13	7	25.1%	9.8%	17.3%	10.5%
Nov.	35	2,224	321118	13.6	2361	0.15	9	27.5%	11.4%	19.0%	10.5%
Dec.	26	2,024	291359	13.6	2142	0.12	9	26.9%	12.1%	16.4%	10.3%
YEAR	308	22,470	3657 mil.	13.5	27,123	0.11	8	27.7%	11.1%	18.8%	10.8%

* liters / 100 km.

Table 8
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1984

Month	# killed	#injured	liters clear gas (thou.)	km. conversion factor*	km. driven (MIL.)	deaths/ 100 thou. km.	injuries/ 100 thou. km.	% Unemployment, B.C.			
								Males		Females	
								15-24	25+	15-24	25+
Jan.	17	1,595	292314	13.7	2134	0.08	7	27.5%	13.2%	20.5%	12.2%
Feb.	20	1,466	310675	13.7	2268	0.09	6	29.4%	13.4%	20.0%	12.0%
March	14	1,634	260874	13.7	1904	0.07	9	28.7%	14.4%	19.1%	11.8%
April	22	1,656	261850	12.8	2046	0.11	8	30.4%	14.0%	19.2%	12.0%
May	17	1,886	284695	12.8	2224	0.08	8	28.6%	13.9%	20.7%	12.6%
June	40	1,953	283137	12.8	2212	0.18	9	24.5%	12.5%	21.4%	11.9%
July	21	1,980	329667	12.9	2556	0.08	8	23.3%	12.3%	19.0%	10.6%
Aug.	38	2,072	306138	12.9	2373	0.16	9	21.8%	11.8%	18.2%	11.4%
Sep.	21	2,015	341703	12.9	2649	0.08	8	22.7%	11.9%	19.0%	12.6%
Oct.	18	2,112	350813	14.2	2453	0.08	9	22.5%	11.4%	20.2%	12.6%
Nov.	18	2,203	298638	14.2	2088	0.09	11	23.1%	12.8%	18.7%	12.2%
Dec.	26	2,338	320838	14.2	2244	0.12	10	23.4%	13.2%	18.0%	12.8%
YEAR	272	22,910	3643 mil.	13.4	27,151	0.10	8	25.5%	12.9%	19.5%	12.1%

* liters / 100 km.

Table 9
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1977

Month	Fatal Incidents						Injury Only Incidents					
	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1
Jan.	20	25%	60	15%	30	74%	1,252	20%	2,591	21%	32	68%
Feb.	20	43%	50	2%	32	78%	1,090	23%	2,438	17%	31	71%
March	29	36%	68	6%	26	84%	1,273	20%	2,682	21%	33	69%
April	26	39%	58	14%	33	78%	1,216	25%	2,630	20%	32	71%
May	36	21%	95	10%	35	79%	1,505	22%	3,259	21%	31	69%
June	23	40%	72	15%	41	59%	1,312	17%	2,893	20%	31	71%
July	34	52%	112	5%	29	83%	1,462	18%	3,429	20%	31	72%
Aug.	49	34%	125	16%	31	73%	1,464	17%	3,536	21%	32	72%
Sep.	24	42%	77	12%	28	82%	1,369	18%	3,040	25%	32	71%
Oct.	44	36%	92	38%	27	83%	1,396	22%	3,153	66%	31	71%
Nov.	33	50%	84	30%	35	78%	1,404	19%	2,996	74%	32	68%
Dec.	21	23%	56	50%	40	82%	1,324	17%	2,996	75%	32	68%
YEAR	359	36.6%	949	17.4%	32.5	77.9%	16,067	19.8%	35,643	33.8%	31.7	70.1%

Table 10
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1978

Month	Fatal Incidents						Injury Only Incidents					
	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1
Jan.	17	50%	40	23%	33	81%	1,078	14%	2,465	74%	32	72%
Feb.	20	31%	42	41%	27	89%	1,100	14%	2,303	74%	32	69%
March	24	61%	83	34%	32	79%	1,092	19%	2,332	72%	32	73%
April	18	33%	45	33%	37	83%	1,196	21%	2,555	68%	31	70%
May	29	36%	61	21%	28	91%	1,350	21%	2,863	69%	31	70%
June	35	30%	78	45%	34	63%	1,337	16%	2,887	65%	31	69%
July	32	46%	70	24%	26	84%	1,384	17%	3,124	66%	31	68%
Aug.	21	43%	91	37%	31	79%	1,603	15%	3,716	67%	31	72%
Sep.	24	29%	55	35%	33	79%	1,653	17%	3,741	65%	31	73%
Oct.	39	41%	94	38%	33	79%	1,550	17%	3,487	66%	31	71%
Nov.	30	28%	72	35%	34	77%	1,688	14%	3,651	67%	32	70%
Dec.	28	19%	64	36%	38	81%	1,658	15%	3,833	67%	32	70%
YEAR	327	37.1%	795	34.1%	32.1	79.9%	16,698	16.5%	36,957	67.8%	31.4	70.7%

Table 11
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1979

Month	Fatal Incidents						Injury Only Incidents					
	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1
Jan.	17	19%	60	23%	32	82%	1,511	13%	3,269	67%	32	72%
Feb.	28	30%	80	34%	39	82%	1,534	14%	3,440	66%	32	71%
March	28	43%	64	36%	28	96%	1,270	15%	2,739	64%	32	67%
April	22	32%	63	32%	33	77%	1,384	16%	3,045	63%	31	70%
May	22	33%	56	34%	32	77%	1,414	14%	3,187	62%	32	70%
June	24	57%	72	26%	34	75%	1,598	17%	3,798	59%	31	71%
July	34	24%	98	17%	31	72%	1,575	15%	3,697	60%	31	71%
Aug.	28	40%	82	34%	39	81%	1,628	15%	3,831	59%	30	71%
Sep.	34	35%	81	28%	27	85%	1,666	13%	3,838	62%	31	69%
Oct.	24	50%	54	19%	28	79%	1,695	14%	3,902	62%	32	69%
Nov.	20	33%	40	20%	31	79%	1,751	14%	3,900	63%	32	68%
Dec.	39	17%	94	45%	38	79%	1,770	13%	4,109	64%	32	70%
YEAR	320	33.9%	844	29.6%	32.9	80.6%	18,796	14.4%	42,755	62.5%	31.5	69.9%

Table 12
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1980

Month	Fatal Incidents						Injury Only Incidents					
	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1
Jan.	15	13%	35	20%	30	71%	1,305	12%	2,994	64%	32	69%
Feb.	17	25%	31	48%	38	71%	1,465	15%	3,118	64%	32	69%
March	23	38%	49	27%	31	78%	1,474	16%	3,320	69%	31	70%
April	30	30%	73	25%	32	80%	1,489	15%	3,492	61%	31	69%
May	34	38%	94	29%	31	82%	1,684	18%	3,821	59%	30	70%
June	32	20%	75	15%	33	84%	1,797	15%	4,129	59%	31	71%
July	31	32%	68	46%	33	81%	1,801	15%	4,330	64%	31	70%
Aug.	47	24%	130	34%	30	80%	1,894	16%	4,559	61%	32	74%
Sep.	46	15%	108	29%	29	84%	1,764	14%	3,807	64%	32	71%
Oct.	39	55%	102	20%	29	92%	1,892	16%	4,254	65%	31	71%
Nov.	32	16%	78	38%	35	88%	2,102	13%	4,777	67%	32	71%
Dec.	31	13%	77	43%	35	81%	1,681	13%	4,054	68%	32	71%
YEAR	377	27.1%	920	30.4%	31.8	82.3%	20,348	15.0%	46,655	63.0%	31.5	70.6%

Table 13
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1981

Month	Fatal Incidents						Injury Only Incidents					
	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1
Jan.	19	33%	46	30%	39	100%	1,557	14%	3,415	66%	32	68%
Feb.	30	34%	75	25%	32	87%	1,640	14%	3,661	65%	31	69%
March	36	15%	88	31%	32	78%	1,695	17%	3,803	63%	31	70%
April	31	27%	89	28%	34	81%	1,750	15%	3,817	65%	31	72%
May	38	42%	106	28%	31	92%	1,962	18%	4,379	62%	30	70%
June	30	36%	85	34%	35	77%	2,091	16%	4,610	63%	31	70%
July	35	20%	115	19%	31	69%	1,922	16%	4,514	59%	31	71%
Aug.	58	32%	169	30%	27	84%	1,894	16%	4,366	60%	31	71%
Sep.	39	46%	98	24%	31	82%	1,717	15%	3,814	62%	31	70%
Oct.	36	40%	94	25%	37	73%	1,931	16%	4,204	65%	31	70%
Nov.	30	17%	75	28%	35	79%	1,863	15%	4,085	64%	31	68%
Dec.	24	35%	60	27%	40	71%	2,054	12%	4,640	66%	32	68%
YEAR	406	31.6%	1,100	27.4%	32.9	80.8%	22,076	15.3%	49,308	63.3%	31.1	69.7%

Table 14
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1982

Month	Fatal Incidents						Injury Only Incidents					
	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1
Jan.	14	8%	36	33%	45	71%	1,437	11%	3,341	70%	32	69%
Feb.	17	37%	49	35%	40	69%	1,338	14%	2,805	67%	33	70%
March	20	37%	45	27%	34	90%	1,225	15%	2,269	66%	32	70%
April	24	27%	59	27%	31	87%	1,210	18%	2,480	64%	32	71%
May	34	32%	68	38%	36	82%	1,285	18%	2,710	64%	31	70%
June	28	37%	53	24%	29	81%	1,365	16%	2,980	64%	32	72%
July	22	32%	58	40%	42	77%	1,417	16%	3,375	66%	31	73%
Aug.	30	24%	62	31%	40	77%	1,360	17%	3,193	68%	32	71%
Sep.	24	29%	68	28%	37	75%	1,307	14%	2,879	68%	33	68%
Oct.	28	30%	63	29%	39	79%	1,570	15%	3,479	68%	32	69%
Nov.	29	24%	86	39%	33	83%	1,592	13%	3,494	72%	34	65%
Dec.	18	12%	40	37%	40	83%	1,469	12%	3,221	74%	34	67%
YEAR	288	28.4%	687	33.6%	36.7	80.1%	16,575	14.9%	36,226	68.0%	32.3	69.3%

Table 15
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1983

Month	Fatal Incidents						Injury Only Incidents					
	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1
Jan.	15	14%	35	49%	33	67%	1,160	14%	2,325	75%	33	66%
Feb.	16	20%	37	37%	37	76%	1,217	13%	2,320	77%	33	69%
March	15	27%	32	47%	41	79%	1,104	16%	2,407	75%	33	68%
April	25	37%	60	22%	31	87%	1,169	18%	2,592	73%	32	71%
May	26	15%	64	48%	34	81%	1,219	17%	2,732	76%	33	66%
June	23	25%	73	47%	30	91%	1,317	15%	2,986	80%	33	70%
July	18	44%	44	43%	40	61%	1,267	13%	3,024	79%	32	70%
Aug.	14	21%	28	39%	31	77%	1,127	15%	2,849	80%	33	69%
Sep.	23	36%	54	61%	33	77%	1,271	13%	2,960	80%	32	67%
Oct.	29	43%	75	35%	33	81%	1,352	17%	3,152	81%	33	68%
Nov.	24	14%	66	54%	36	70%	1,504	11%	3,543	82%	34	66%
Dec.	17	37%	54	65%	36	94%	1,393	10%	3,393	82%	34	67%
YEAR	245	28.6%	622	45.7%	34.4	79.1%	15,100	14.2%	34,283	78.6%	33.1	68.1

Table 16
Passenger Vehicle Incidents, Excluding Motorcycle, Pedestrian & Bicycle, British Columbia, 1984

Month	Fatal Incidents						Injury Only Incidents					
	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1	# incidents	% alcohol related	# occupants	% restrained	Mean Age Driver 1	% Male Driver 1
Jan.	15	14%	30	43%	32	80%	1,066	9%	2,658	83%	34	67%
Feb.	16	67%	57	26%	34	62%	991	12%	2,267	81%	33	66%
March	12	18%	31	52%	34	75%	1,057	16%	2,536	81%	33	69%
April	20	32%	51	59%	33	75%	1,067	14%	2,577	81%	33	70%
May	15	40%	40	50%	32	93%	1,278	14%	3,047	82%	33	67%
June	27	31%	82	35%	29	77%	1,280	13%	3,064	80%	33	68%
July	17	53%	45	42%	33	93%	1,298	13%	3,180	81%	33	70%
Aug.	28	39%	85	40%	42	84%	1,328	13%	3,385	79%	33	68%
Sep.	18	33%	36	44%	36	88%	1,359	12%	3,323	83%	33	68%
Oct.	17	25%	28	61%	33	76%	1,428	12%	3,452	85%	33	67%
Nov.	14	23%	35	66%	39	86%	1,529	10%	3,581	86%	34	68%
Dec.	16	31%	47	83%	43	62%	1,555	8%	4,059	86%	35	67%
YEAR	215	34.6%	567	47.8%	35.1	79.3%	15,236	12.1%	37,129	82.6%	33.5	67.9%

SECTION 2

THE MEDIA AND POLICE ENFORCEMENT CAMPAIGNS

The Relationships among Driving While Impaired Charges, Police Drinking Driving Roadcheck Activity, Media Coverage and Alcohol-Related Casualty Traffic Accidents

Print Media Content and Drinking-Driving Accidents British Columbia, 1980-1984

The Kamloops Experiment: Media Amplification of a 2-week Drinking-Driving Police Roadcheck Enforcement Campaign in a British Columbia Community

The Effects of Media Amplification of Police Presence in a 2-week Intersection Enforcement Campaign

The Relationships among Driving While Impaired Charges, Police Drinking Driving Roadcheck Activity, Media Coverage and Alcohol-Related Casualty Traffic Accidents

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THE RELATIONSHIPS AMONG DRIVING WHILE IMPAIRED CHARGES, POLICE DRINKING–DRIVING ROADCHECK ACTIVITY, MEDIA COVERAGE AND ALCOHOL-RELATED CASUALTY TRAFFIC ACCIDENTS

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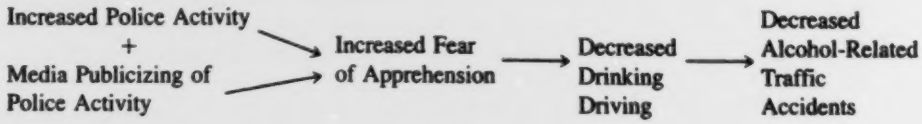
(*Received* 5 *December* 1984; *in revised form* 17 *June* 1985)

Abstract—A correlational examination of 54 consecutive months of data from British Columbia on the relationships among the number of vehicles checked in police drinking–driving roadchecks, the number of driving while impaired (DWI) charges laid, the number and percent of alcohol-related casualty traffic accidents, and the extent of media coverage on drinking–driving (as measured by print media coverage), revealed that: the extent of media coverage, and *not* the extent of roadchecks or charging activity is probably the critical element in the reduction of drinking–driving accidents. The failure of the minimally publicized April–May 1984 British Columbia police roadcheck "blitz" to reduce either the number or proportion of alcohol-related casualty traffic accidents lent support to these correlational findings.

INTRODUCTION

Many types of criminal offences vary systematically from hour to hour, from day of week to day of week, and from month to month. Driving while impaired by alcohol is one such criminal activity—it tends to occur most frequently after 10 P.M., on Fridays and Saturdays, and in the Spring and Summer. Because of the predictable regularity of driving while impaired (DWI) offences, this crime lends itself to varying rates of enforcement efforts, in terms of both preoffence prevention and postoffence apprehension. Arguably, the drinking–driving "blitz" of media campaigns, police roadchecks and DWI law enforcement is a successful tool in temporarily reducing the incidence of drinking–driving. For example, in the province of British Columbia, Canada, both the number and the proportion of alcohol-related casualty traffic accidents are regularly at their lowest of the year during the month-long Christmas and New Year media, roadcheck and enforcement "blitzes" (Mercer, 1982). Indeed, Ross (1984) in his review of the literature on enforcement crackdowns, notes that there is "generally a correlation between the level of enforcement and the reduction of nighttime fatalities" (p. 30), although he also cites an enforcement crackdown that "lacked any detectable effect . . . when the press had failed to note the increased police activity" (p. 29).

Presumably, the mechanism underlying the success of these crackdowns works in the following manner:



However, in order to best deploy the limited resources of police manpower for roadchecks and enforcement, as well as the limited resources of media support of same, it is necessary to determine the relative contributions of these factors to any change in the rate and proportion of alcohol-related traffic accidents. Therefore, it is the purpose of this paper to examine the relationships among police roadcheck activity, DWI charges, media coverage, and alcohol-related traffic accidents resulting in injury or death (i.e. casualty accidents).

METHOD

In order to examine the relationships among police roadcheck activities, DWI charge frequency, media amplification of the police activity, and alcohol-related casualty traffic accidents, both correlational and quasi-experimental techniques were used.

Correlational Aspects:

Using "the month" as the unit of analysis, the following variables were examined for the entire province.

1) The number of alcohol-related casualty accidents reported in the month, as recorded on the Traffic Accident Report Form (MV 104) by the attending police officers. The reason that only casualty accident data was used is that property damage-only accidents are self-reported by the persons involved, do not require a police investigation, and therefore are of questionable validity. On the other hand, accidents resulting in casualties must be investigated by the police. It should be noted that the determination of alcohol-involvement is done by trained investigating traffic police officers using provincially homogeneous forms and techniques, and that the same forms and police training techniques have been in place since 1977. For the purposes of this paper, a casualty accident was classified as "alcohol involved" if, in the opinion of the investigating officers, alcohol was the single primary cause of the accident (79 months of data: Dec. 1977–June 1984: mean = 305/month).

2) The percentage of alcohol-related casualty traffic accidents per month from 1) above. Because the absolute number of alcohol-related accidents will vary from month to month as the total number of accidents varies, and because this absolute number can also be influenced by such factors as the weather, economy and so on, the percentage of alcohol-related casualty accidents can be seen as a superior and more stable measure of the relative prevalence of drinking–driving casualty accidents over the simple number of alcohol-related casualty accidents. (79 months of data: Dec. 1977–June 1984: mean = 15%/month).

3) The number and proportions from 1) and 2) above for the month following. The assumption here is that the combination of media, roadchecks and DWI charges, by reducing drinking–driving in one month, may reduce drinking–driving accidents in the following month (78 months of data: Jan. 1978–June 1984).

4) The number of driving while impaired charges laid in the month, as supplied by the police for Statistics Canada (79 months of data: Dec. 1977–June 1984: mean = 1722 charges/month).

5) The number of vehicles stopped by mobile blood alcohol testing vehicle team (i.e. BATmobiles) roadchecks per month. These police-run roadchecks stop vehicles on a random basis, and while they do not represent the sum of all police drinking–driving roadchecks, they can be seen as a general measure of the variation in these roadchecks (79 months data: Dec. 1977–June 1984: mean = 17702/month).

6) The number of drinking–driving related newspaper and magazine articles published in the province per month, as collected by a clipping service. This clipping service examines a total of 188 different print sources and publications, and found an average of 137 drinking–driving related articles per month. The assumption here is that these articles reflect the general level of media interest in both drinking–driving in general and DWI-related police activity in particular. Unfortunately, no measures of television or radio drinking–driving messages and articles were available over this time span (54 months data: Jan 1980–June 1984), as these messages originate from literally dozens of television stations and scores of radio stations located in both Canada and the United States.

7) The date, a variable used to measure and control for any linear variations across time (79 months: Dec. 1977–June 1984).

All of the above variables were examined using zero-order (Pearson's *r*) correlations. In addition, both the number and proportion of alcohol-related casualty traffic accidents were examined using partial correlations controlling for time, number of DWI charges, number of drinking–driving clippings, and number of vehicles checked by BATmobiles.

Quasi-Experimental Aspects:

Knowing that drinking–driving accidents occur in a high proportion in the Spring, and having produced the province-wide Christmas drinking–driving roadcheck blitz programs annually since 1977, the police throughout British Columbia decided to try to reduce these accidents by mounting a province-wide four-week roadcheck, enforcement and media crackdown from 20 April to 21 May 1984.

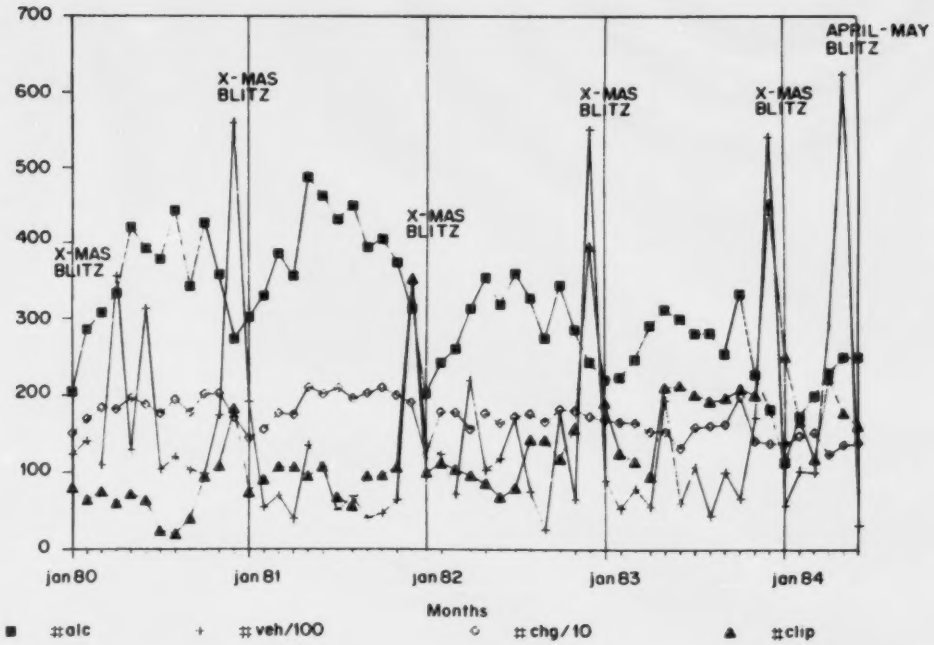


Fig. 1. Driving while impaired.

This activity was coordinated by the Police Advisory Committee (PAC) which is made up of senior traffic officers representing all of the police groups and geographic regions of the province.

However, due to a number of factors, the media aspect of the blitz was not particularly widespread. First, two daily newspapers in Vancouver were on strike for the duration of the blitz. Second, except for three 30 sec radio commercials and a press release, no additional media support such as specific television messages, bumper stickers, clip sheets, brochures, posters and so on were produced for the blitz. As can be seen from Fig. 1, media coverage of this blitz was substantially less than that for the previous Christmas blitz, as reflected in the drinking–driving newspaper clipping counts.

In order to measure the impact of the April–May blitz on the number and proportion of drinking–driving casualty accidents, on the print media and on DWI charge numbers, Box–Jenkins projections were produced for these variables so that their projected April–May values could be compared to their actual values.

Finally, province-wide telephone surveys of randomly selected, gender and age representative samples of persons over 15 years of age were taken in the week before the blitz ($N = 249$) and the week after the blitz ($N = 252$). These surveys were conducted in order to measure any changes in reported drinking–driving, perceived likelihood of apprehension for drinking–driving, awareness of any groups campaigning against drinking–driving, and awareness of the police roadcheck activity.

RESULTS

Correlational Results:

The zero-order correlations presented above the diagonal in Table 1 show: that as the number of vehicles checked by the police increases, so does media coverage; as media coverage and the number of vehicles checked increase, both the number and proportion of alcohol-related casualty accidents decrease, not only in the month of the media support and roadchecks, but also in the month following these activities; that there is no particular relationship between the number of vehicles checked and DWI charges laid; and, that as both the number and percentage of alcohol-related casualty traffic accidents increase, so do DWI charges.

Table 1. Zero-order and partial correlations on police activity, media coverage, DWI charges and alcohol-related casualty traffic accidents in British Columbia

Variable	PCTALC	NALC	NDWICHG	NCLIP	BATCHK	PCTALC+1	NALC+1	Mean	Standard Deviation	# of Months
Month and Year (Date)	-.38 p=.001	-.20	-.40 p=.000	.52 p=.000	-.22 p=.04	-.32 p=.005	-.17			79
Percentage of Casualty Traffic Accidents Involving Alcohol (PCTALC)		.47 p=.000	.45 p=.000	-.58 p=.000	-.18	.59 p=.000	.43 p=.000	14.9	2.1	79
Number of Casualty Traffic Accidents Involving Alcohol (NALC)			.71 p=.000	-.51 p.=000	-.17	.07	.78 p=.000	304.5	74.4	79
Number of DWI Charges (NDWICHG)	.50 p.=000	.66 p.=000		-.36 p.=008	-.05	.12	.49 p=.000	1722.0	202.4	79
Number of DWI Press Clippings (NCLIP)	-.56 p=.000	-.31 p=.02			.50 p.=000	-.61 p=.000	-.70 p=.000	137.3	84.6	54
Number of Vehicles Stopped in BATmobile Roadchecks (BATCHK)	.19	.10				-.26 p=.02	-.36 p=.001	17701.9	15597.4	79
Percentage of Casualty Traffic Accidents Involving Alcohol in the Following Month (PCTALC+1)			-.09	-.51 p=.000	.04		.49 p=.000	14.9	2.1	78
Number of Casualty Traffic Accidents Involving Alcohol in the Following Month (NALC+1)			.28 p=.05	-.50 p=.000	.03			304.8	74.9	78

UPPER DIAGONAL - Zero order correlations LOWER DIAGONAL - Partial correlations controlling for DATE, NDWICHG, NCLIP, BATCHK

These relationships are also shown graphically in Figs. 1, 2 and 3. In more detail, Fig. 1 shows, in monthly figures from January 1980 to June 1984: the number of alcohol-related casualty accidents (#alc); the number of print media clippings concerning drinking–driving (#clip); the number of vehicles checked by BATmobile police teams, divided by 100 (#veh/100); and the number of DWI charges divided by 10 (#chg/10). These latter variables were divided by 100 and 10, respectively, in order to better illustrate the changes in variance among all of the variables. Similarly, the variables illustrated in Figs. 2 and 3 were standardized by converting them to "Z-scores" in order to better illustrate the relationships among the variance in each. Figure 2 shows, in monthly increments from January 1980 to June 1984, the relationship between the number of DWI charges laid (#chgZ) and the percentage of alcohol-related casualty accidents in the month (%alcZ), while Fig. 3 shows the relationships among the percentage of alcohol-related casualty accidents, the number of vehicles stopped by BATmobile teams (#vehZ), and the number of print media articles dealing with drinking–driving (#clipZ). It should be mentioned that the percentage, rather than the number, of casualty accidents which were alcohol-related was chosen for these two figures because this measure is less susceptable to spurious fluctuations caused by changes in the absolute number of casualty accidents, and therefore is a more valid indicator of change, as was noted earlier.

However, the partial correlations below the diagonal in Table 1 show that, when the influences of time, the number of DWI charges laid, and the number of vehicles checked by the police at roadchecks were controlled for, then media coverage (as measured by the number of drinking–driving clippings) related significantly to a reduction in *both* the percent and number of alcohol-related casualty traffic accidents in the month of the media coverage, as well as in the month following. On the other hand, when the effects of time, DWI charges laid and media coverage were controlled for, the number of vehicles checked did *not* relate significantly to a reduction in either the percent or number of alcohol-related casualty traffic accidents, neither for the month of the checks, nor for the following month. Similarly, when the effects of time,

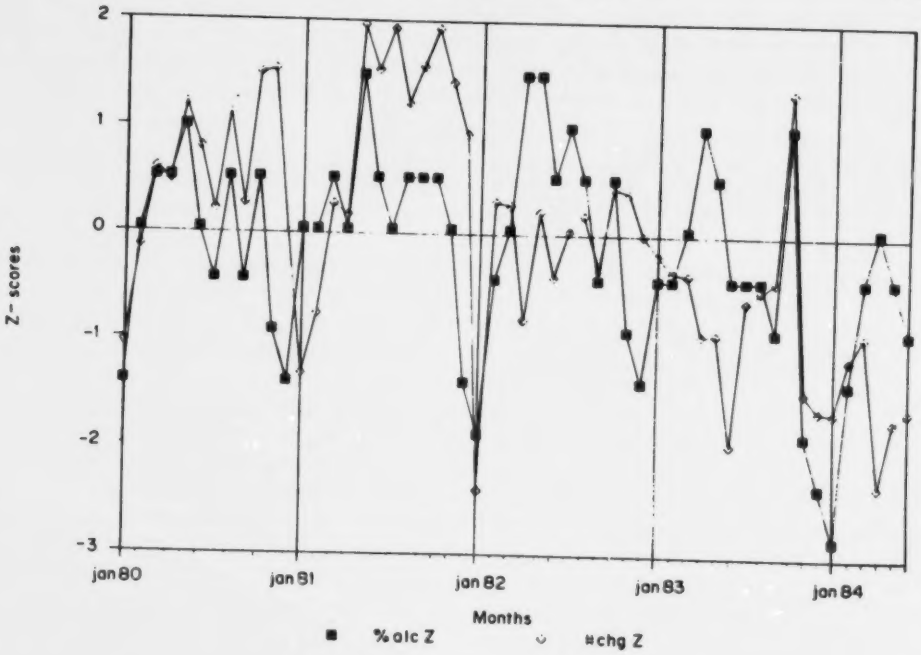


Fig. 2. DWI, z-scores.

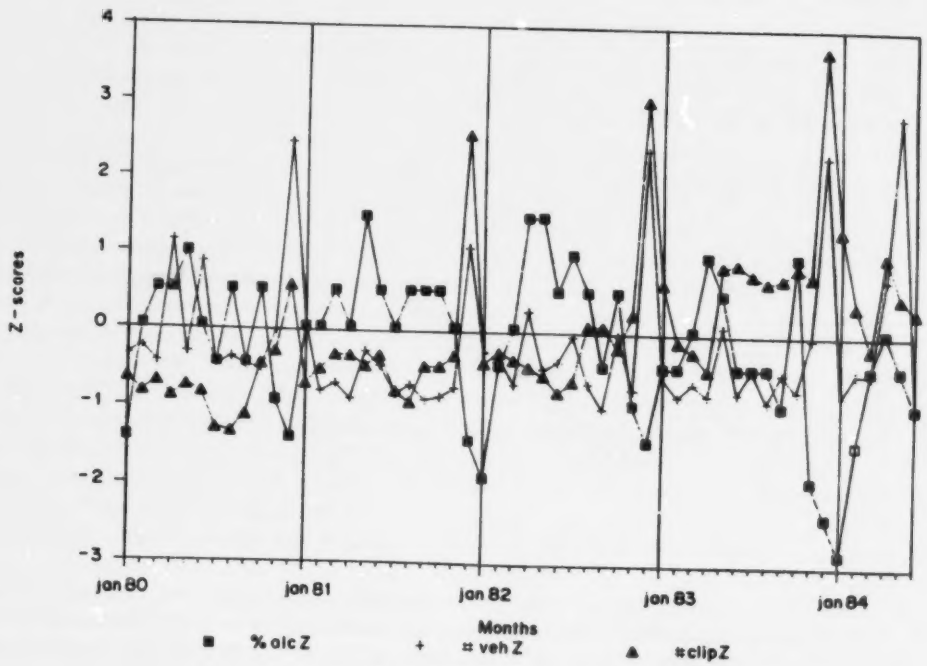


Fig. 3. DWI, z-scores.

number of vehicles checked, and media coverage were controlled for, the number of DWI charges laid in the month did not relate to a reduction in alcohol-related casualty traffic accidents, either in the month of the charges or in the following month. In short, when the effects of the other variables were controlled for, media coverage was the *only* statistically significant predictor of a reduction in either the number or percentage of alcohol-related casualty accidents.

Quasi-Experimental Results:

The police activity in the four-week April–May blitz was clearly comparable to the levels of activity associated with the Christmas blitz, as can be seen from Figs. 1, 2 and 3. On the other hand, Box–Jenkins statistical projections ($p = .05$) based on monthly data commencing January 1978, indicated that no more or fewer DWI charges were laid during this period than would probably have been laid had there been no blitz. The projected figure for April was 1499 with a lower confidence limit of 1176 and an upper limit of 1822 while the projected figure for May was 1586 with a lower limit of 1236 and an upper limit of 1935. The actual April and May figures were 1250 and 1373.

Turning to media coverage (as measured by drinking–driving related print media articles collected by Western Clipping Service), unfortunately this blitz occurred when the two daily Vancouver newspapers were on strike, and this probably reduced the public's awareness of the blitz. However, the province-wide airing of three 30 sec radio messages advertising the blitz may have lessened the impact of the newspaper strike somewhat. In any case, Figs. 1 and 3 show that, at least with regard to print penetration, the frequency of articles dealing with drinking–driving during the blitz period in no way approached the frequency of these articles during the previous Christmas blitz. Indeed, a Box–Jenkins projection based on monthly data commencing January 1980 indicated that the number of these articles was within what would have been expected had a blitz not occurred: the projected figure for April was 84 with an upper and lower confidence limit of 225 and 54, while the projected figure for May was 171 with an upper and lower confidence limit of 310 and 31 ($p = .05$). The actual April and May figures were 217 and 178.

In order to measure any changes in the public's perception of the probability of apprehension for driving while impaired, as well as their awareness of the campaign, any changes in their reported drinking–driving, and their experience with the blitz roadchecks, telephone surveys were taken in the week previous to and the week following the blitz. Statistical tests (chi-square, $p = .05$) were carried out to determine whether or not there were meaningful differences between the responses before and after the blitz, as well as if there were differences after the blitz between persons living in the Vancouver area where there was a strike of the two daily newspapers, and the rest of the province. In all, 249 persons were interviewed before the blitz and 252 after. The findings were as follows.

1) There was no difference either before and after the blitz or between the newspaper strike and no-strike areas, in terms of perceived likelihood of apprehension. That is, those interviewed did not rate the likelihood of being stopped for drinking–driving any differently before the blitz than after, and did not rate it differently in the strike vs no strike areas.

2) In response to the question "can you name any groups or organizations that have been campaigning against drinking–driving?" the public did not seem to be aware that a blitz was on. They did not mention the groups participating in the blitz (i.e. the police, CounterAttack, the Insurance Corporation of British Columbia) more often after the blitz than before, or more often in the no newspaper strike area than in the newspaper strike area. In fact, 35% said that they did not know of any groups campaigning against drinking–driving whatsoever.

3) Using the same comparisons as above, no differences were found in terms of being a passenger with a drinking driver, being a drinking driver, or having been charged with drinking–driving. Overall, 19% said they had been a passenger with a drinking driver within the previous month, 15% said they had been a drinking driver within the previous month, and 5% said they had at some time been charged with drinking–driving.

4) However, with regard to having seen a roadcheck within the previous month and having been stopped at a roadcheck within the previous month, there was a large and statistically significant increase after the blitz—17% said they had seen a roadcheck and 6% said they had

been stopped in a roadcheck, while after the blitz the figures were 38% and 12%, respectively (Seen Roadcheck chi-square = 27.4, d.f. = 1, $p < .001$: Stopped at Roadcheck chi-square = 28.4, d.f. = 1, $p < .001$). To put this another way, the numbers of people seeing and being stopped in a roadcheck doubled during the blitz month from the previous month.

Regarding the number of alcohol-related casualty accidents during the blitz period, using a Box–Jenkins projection technique on monthly data commencing January 1978, it was found that, had there been no blitz, there would probably have been between 203 and 357 alcohol-related casualty traffic accidents, with the most likely number to be about 280 ($p = .05$). In fact, there were 251 alcohol-related casualty traffic accidents in May. The Box–Jenkins projection for June was between 179 and 345 accidents, with the most likely number to be about 262 ($p = .05$). There were 251 alcohol-related casualty traffic accidents in June.

Finally, using Box–Jenkins projections on monthly data commencing January 1978 for the percentage of alcohol-related casualty accidents that would have been expected had there been no blitz, the projected figure for May was 15%, with a low of 12% and a high of 14%, while for June it was 13% with a low of 10% and a high of 16% ($p = .05$). The actual figures were: May, 14%; June, 13%. Clearly, the blitz did not seem to reduce either the number or proportion of these accidents below what would have been expected had there been no blitz.

DISCUSSION AND CONCLUSIONS

The quasi-experimental analyses indicated that the 20 April–21 May 1984 drinking–driving roadcheck, enforcement and media blitz was not successful: the public did not appear to be aware that a blitz was on, even though about 38% reported having seen a roadcheck and 12% reported having been stopped in a roadcheck. Further, the public did not appear to alter their drinking–driving habits, while media coverage of drinking–driving topics (as measured by print media clippings) did not rise above what would have been expected had there been no blitz. And finally, neither the number nor proportion of alcohol-related casualty traffic accidents dropped below what would have been expected had there been no blitz.

The immediate question that comes to mind is: how could a month-long blitz that utilized 13 290 police hours, stopped 265 455 vehicles, and cost at least a half million dollars in police time, have failed to reduce drinking–driving? Before dealing with this particular question, a number of points need to be made.

First, the previous Christmas blitzes involved both police activity and substantial amounts of media coverage, and the number and proportion of alcohol-related casualty accidents were at their lowest of the year during these blitzes. As can be seen from Table 1 and Figs. 1 and 3, media coverage (as measured by drinking–driving related print media clippings) and police activity (as measured by the number of vehicles checked by BATmobiles) tend to go hand in hand. Second, these influences together significantly reduce both the number and proportion of alcohol-related casualty accidents, as shown in Table 1 and in Figs. 1 and 3. Third, DWI charges and alcohol-involved casualty accidents tend to rise and fall together, both probably reflecting the frequency of drinking–driving, as shown in Fig. 3. Finally, the extent of media coverage produced by the April–May blitz did not begin to approach the level of media coverage experienced in the recent Christmas blitzes, even though the number of vehicles stopped and the number of DWI charges laid were at least comparable to the Christmas levels.

Arguably, the missing element in the April–May drinking–driving blitz was sufficient media coverage. It is not enough that the public only see roadchecks—in British Columbia the public ought to be relatively familiar with them. What appears to be necessary is that the public know that there is a blitz on. Without this crucial piece of information, the blitz roadcheck becomes just another roadcheck, represents no special increase in police activity, and thus does not increase the public's perceived fear of apprehension.

Further, it may not be enough to raise the media coverage to Christmas levels in order to attain a comparable drop in the percentage of alcohol-related casualty traffic accidents. It may take a number of years of combined roadchecks and vigorous media campaigns for the public to associate the April–May blitz period with an increased likelihood of being apprehended for driving while impaired.

However, the failure of this particular blitz to reduce alcohol-related casualty traffic accidents is overshadowed by the implication of this failure combined with the results of the partial correlation analyses. That is, the partial correlations strongly suggested that the critical and essential element for police roadcheck activity to be successful in reducing alcohol-related accidents is the widespread media coverage of same, so that the public is aware that this activity is occurring. Further, these partial correlations further suggested that the number of vehicles stopped and the number of driving while impaired charges laid are inconsequential without extensive media support and therefore extensive public awareness. The strength of these conclusions was reinforced by the failure of the minimally advertized April–May blitz to reduce alcohol-related casualty accidents in any way. In short, there is compelling evidence that police drinking–driving roadcheck activity will have little effect on reducing drinking–driving accidents without the public being made aware of this activity through substantial media support. The exact nature and extent of the support necessary is a topic in need of investigation.

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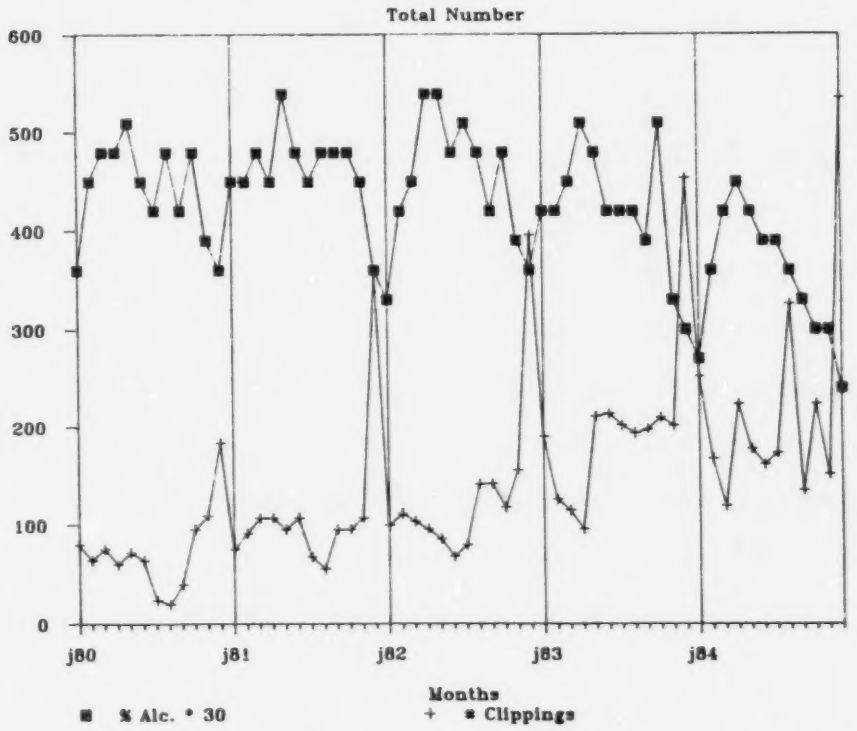
Print Media Content and Drinking-Driving Accidents
British Columbia, 1980 - 1984

SUMMARY

This examination of print media in British Columbia from 1980-1984 shows that monthly increases in the number of articles on drinking driving related to decreases in the monthly percentage of alcohol-related casualty traffic accidents. This can in part be explained by the third variable of the December CounterAttack roadcheck enforcement blitzes. When drinking-driving blitzes occur, they generate a large number of press articles that are blitz-specific, as well as a large number that are on drinking driving in general. Arguably, these articles increase drivers' perception of both the general dangers of drinking driving, as well as the specific threat of an increased probability of apprehension for drinking driving. Consequently there is less drinking driving and fewer alcohol-related traffic accidents.

FIGURE 1

DWI Newspaper Clippings- B.C.



On the other hand, the monthly proportion of print article content or monthly proportion of groups mentioned in drinking-driving articles failed to predict any monthly reduction in alcohol-related casualty traffic accidents. One possible explanation for this finding could be that, in a broader sense, there is very little difference between one press article on drinking driving and another. That is, all of the articles condemn drinking driving and are therefore all essentially the same message, so it really does not matter to the reader to which specific group the message is attributed. Similarly, the article content codes developed for this study may be measuring differences that are too subtle to be meaningful or produce varying effects on the readers of the articles.

Finally, the overall trend of an increase in print articles on drinking driving and a decrease in the percentage of alcohol-related traffic accidents suggests that public attitude may be becoming less accepting of drinking driving, and consequently there are fewer drinking drivers on the roads. Perhaps with continued enforcement and public education these attitude changes can be maintained to produce a long-lasting reduction in drinking-driving accidents.

Print Media Content and Drinking-Driving Accidents British Columbia, 1980 - 1984

It has been shown that there is a strong association between the extent of media coverage on drinking-driving issues and a reduction in both the number and proportion of alcohol-related casualty traffic accidents, while the extent of police roadcheck activity and the number of Driving While Impaired Charges laid by the police did not appear to reduce these accidents without accompanying media amplification of these activities (Mercer, 1985). However, if frequent media coverage of drinking-driving topics reduces alcohol-related traffic accidents, the question that follows is "what sorts of specific media content best relates to a reduction in accidents?" For example, do media messages and articles that report on accidents account for more of a reduction in alcohol-related accidents than do those that publicize a specific drinking-driving roadcheck campaign?

Consequently, it is the purpose of this paper to examine the relationships between the content of print articles on drinking driving and the percentage of alcohol-related traffic accidents where persons are injured or killed (i.e. casualty accidents) in order to determine whether or not the theme of these articles affects the frequency of drinking-driving accidents.

METHOD

Between 1980 and 1984 the Western Press Clipping Service has been examining all print media in British Columbia for articles relating to any aspect of drinking driving and has been forwarding same to the CounterAttack Program. A 50% random sampling was done from these clippings and each clipping was coded in terms of, among other things, its content, groups mentioned, and month of publication. Over this period a total of 8,922 clippings were gathered. In addition, the percentage of police-investigated alcohol-related casualty accidents per month in B.C. was collected from the Traffic Accident Report Forms (MV104) completed by the police and compiled by the Motor Vehicle Department of the Ministry of Transportation and Highways.

Analyses:

Codes for both clipping content and groups mentioned in each clipping were developed, and any single group or content code comprising 4% or more of the total numbers of clippings were retained for analysis. The remaining content and group codes were classified in "Other" categories.

The group codes that emerged over this period were: CounterAttack (an anti-drinking driving program sponsored by the Ministry of Attorney General of B.C. and the Insurance Corporation of B.C.) - 27%; R.C.M.P. (Royal

Canadian Mounted Police - the force policing the majority of B.C.) - 19%; Attorney General - 7%; M.A.D.D. (Mothers Against Drinking Driving) - 6%; and I.C.B.C. (Insurance Corporation of B.C.) - 4%. The remaining 37% of the clippings mentioned various other groups, no one of which comprised as much as 4% of the total number of clippings.

The content codes that emerged were: Advertizing Campaigns (articles describing various specific police enforcement and public information campaigns, especially the Christmas and New Year roadcheck campaigns) - 27%; DWI Laws (articles dealing with drinking-driving laws and proposed changes in same) - 17%; Educational Programs (articles on drinking-driving education, especially in schools) - 11%; DWI Statistics (articles on the frequency and characteristics of drinking-driving accidents) - 8%; Police Profile (articles on the police and their responses to drinking driving, excluding those articles dealing with specific enforcement campaigns) - 6%; and DWI Accidents (articles describing specific drinking-driving accidents) - 5%. The remaining 27% of the clippings mentioned various other drinking-driving issues, no one of which comprised as much as 4% of the total number of clippings.

Monthly figures for the groups and content categories were calculated in terms of average number in each category and average percentages of the total number in each

category. These were then examined in terms of their relationship to changes in the monthly percentage of alcohol-related casualty traffic accidents using Zero-Order Correlations (Pearson's r) and Partial Correlations controlling for the linear trends across time.

Unfortunately, the 1983 content codes could not be used due to a series of classification errors. Therefore the results are largely spoken to in terms of group codings (as opposed to content codings) that most accurately represent the patterns among the groups and contents codes. These patterns were determined through the examination of the groups by content correlation matrix and an oblique factor analysis of same, both using the individual clippings, as opposed to monthly aggregates or averages, as the unit of analysis.

RESULTS

Data Reduction - Correlations and Factor Analysis:

The coding process resulted in 7 content codes and 6 group codes, totalling 13 clipping-related variables. In order to try to reduce this to a more manageable number and to determine whether or not there were any broad patterns in the data, the correlations between the group codes and content codes were examined and an oblique factor analysis of these variables was carried out.

From Table 1 it can be seen that the CounterAttack

TABLE 1
Contents and Groups Mentioned in British Columbia Drinking Driving Newspaper Clippings, 1979 to 1984 (excluding 1983): Correlation of Groups by Content (N=6,510 clippings)

GROUPS	CONTENTS						
	DWI ACC.	DWI STATS.	DWI LAWS	EDUCATION PROGRAMS	POLICE PROFILE	ADVERT. CAMPAIGNS	OTHER
CounterAttack	-0.11 !	-0.06 *	-0.23 !	-0.05 +	-0.13 !	0.63 !	-0.37 !
M.A.D.D.	-0.04 n	-0.05 n	0.00 n	0.14 !	-0.04 n	-0.07 +	0.03 n
I.C.B.C.	-0.04 n	-0.04 n	-0.01 n	0.41 !	-0.05 +	-0.13 !	-0.07 *
R.C.M.P.	0.12 !	0.14 !	-0.08 !	-0.13 !	0.41 !	-0.19 !	0.06 +
Attorney-General	-0.04 n	0.08 !	0.09 !	-0.07 *	-0.05 +	-0.16 !	0.15 !
Other	0.06 *	-0.03 n	0.24 !	-0.07 *	-0.13 !	-0.31 !	0.27 !

NOTE: + = $p < 0.05$
* = $p < 0.01$
! = $p < 0.001$
n = Not Significant

TABLE 2
Factor Structure, Groups and Content Codes, Oblique Rotation (N=6,510)
British Columbia Newspaper Clippings, 1979 to 1984
(excluding 1983 for Contents):

VARIABLES	FACTORS			
	Other	Police	Ed. Pgms./ I.C.B.C.	Blitz
# DWI Accidents	-0.02	0.14	-0.03	-0.11
# DWI Stats.	-0.01	0.16	-0.02	-0.04
# DWI Laws	-0.10	0.06	-0.03	-0.44
# Educ. Programs	-0.06	-0.09	0.75	0.01
# Police Profile	-0.02	0.48	-0.03	0.00
# Ad. Campaigns	-0.59	-0.34	-0.40	0.52
# Other Content	0.96	-0.12	-0.04	-0.02
# CounterAttack	-0.49	-0.40	-0.21	0.65
# M.A.D.D.	0.07	-0.03	0.18	0.04
# I.C.B.C.	-0.01	-0.04	0.51	0.02
# R.C.M.P.	0.12	0.82	-0.10	0.09
# Attorney-Gen.	0.16	0.00	0.02	-0.01
# Other Groups	0.24	-0.20	-0.17	-0.76

group code is best predicted by the Advertizing Campaign content code, and the Advertizing Campaign content code is best predicted by the CounterAttack group code (r=0.63). Similarly, I.C.B.C. is best predicted by Education Programs and Education Programs is best predicted by I.C.B.C. (r=0.41), R.C.M.P. and Police Profile are each other's best predictors (r=0.41), and the Other Groups code is the best positive predictor of the Other Content code (r=0.27). It follows that these group variables can be used to represent both the group and associated content.

On the other hand, from Table 1 it can also be seen that M.A.D.D., Attorney General, DWI Accidents, DWI Laws, and DWI Statistics codes have generally low correlations that are difficult to interpret. Consequently, all of the content and group variables were factor-analyzed using an oblique rotation of a 4-factor solution arrived at using the discontinuity test. The 4 factors retained all had eigenvalues greater than 1.0 and in all accounted for 54% of the total variance in the correlation matrix. Finally, the factor inter-correlations were all generally low (less than 0.14) indicating a generally orthogonal pattern.

The factor structure that emerged is shown in Table 2. The first factor was interpreted as an "Other" factor, with the "Other" Content code loading positively on the factor at 0.96 and CounterAttack and Advertizing Campaigns loading

negatively at -0.49 and -0.59 respectively. The second factor was interpreted as a "Police" factor, with R.C.M.P. and Police Profile loading positively at 0.82 and 0.48 and CounterAttack and Advertizing Campaigns negatively at -0.40 and -0.34. Factor 3 appeared to be an Education Program/I.C.B.C. factor with those variables loading at 0.75 and 0.51, while Advertizing Campaign loaded negatively at -0.40. Finally, factor 4 was interpreted as a "CounterAttack Blitz" factor, with CounterAttack and Advertizing Campaign loading positively at 0.65 and 0.51 and Other Groups and DWI Law loading negatively at -0.76 and -0.44.

To a great extent the results of the factor analysis confirmed the notion derived from the correlation matrix: that the group variables CounterAttack, I.C.B.C., R.C.M.P., and Other can be seen as being representative of the major themes presented in the print media during the time period under consideration. Consequently the remainder of the Results section and the majority of the Discussion section of this paper will focus primarily on these group variables.

Clipping Frequencies - 1980 to 1984:

From Table 3, it can be seen that the total number of drinking-driving related clippings increased every year from 890 in 1980 to 2,652 in 1984. The seasonal variation in the number of clippings can be seen from Figure 1, with

TABLE 3
Percentage of Newspaper and Magazine Clippings Mentioning Specific Groups by Year, 1980-1984, British Columbia

GROUP MENTIONED	Year					
	1980 (N=890)	1981 (N=1368)	1982 (N=1600)	1983 (N=2412)	1984 (N=2652)	OVERALL (N=8922)
CounterAttack	47%	41%	20%	14%	28%	27%
M.A.D.D.	0%	0%	5%	11%	4%	6%
I.C.B.C.	2%	2%	6%	4%	4%	4%
R.C.M.P.	21%	24%	24%	13%	17%	19%
Attorney-General	10%	9%	12%	5%	4%	7%
Other	20%	24%	33%	47%	43%	37%
TOTAL	100%	100%	100%	100%	100%	100%

TABLE 4
Percentage of Newspaper and Magazine Clippings Dealing with Specific Topics by Year, 1980-1984, British Columbia

CLIPPING CONTENT	Year					
	1980 (N=890)	1981 (N=1368)	1982 (N=1600)	1983 (N=2412)	1984 (N=2652)	OVERALL (N=8922)
DWI Accidents	2%	4%	5%	M	3%	5%
DWI Statistics	11%	10%	8%	I S S I N G D A T A	6%	8%
DWI Laws	16%	16%	25%		12%	17%
Educational Pgms	15%	13%	9%		10%	11%
Police Profile	7%	8%	7%		4%	6%
Ad. Campaigns	19%	26%	16%		34%	27%
Other	30%	23%	30%		31%	27%
TOTAL	100%	100%	100%	100%	100%	100%

FIGURE 2

DWI Newspaper Clippings– B.C.

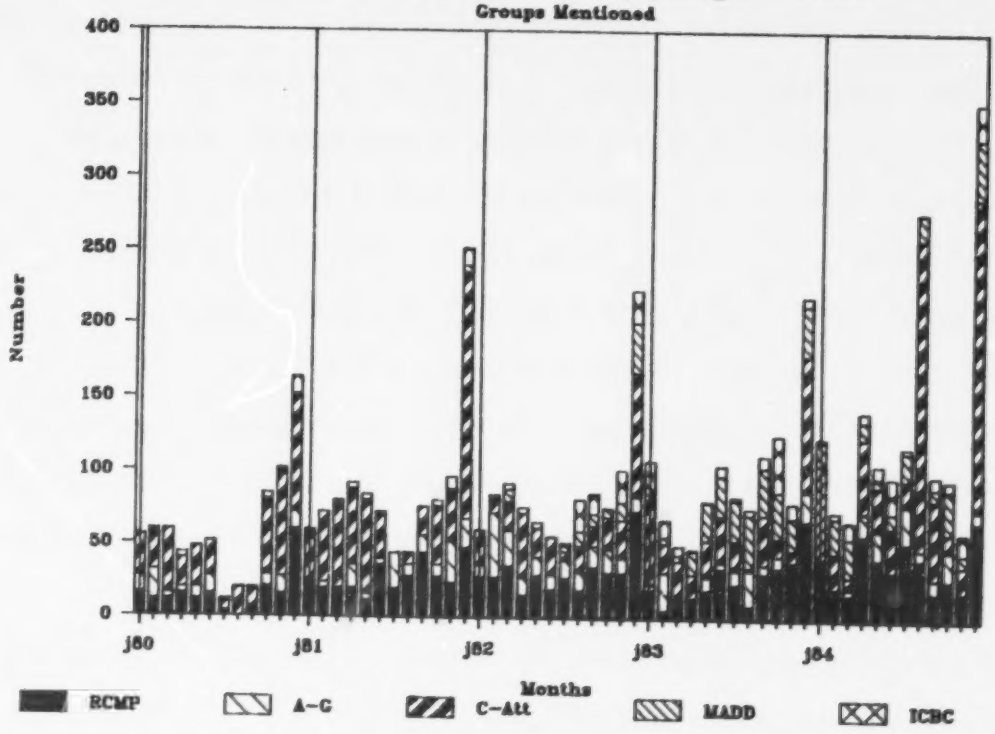
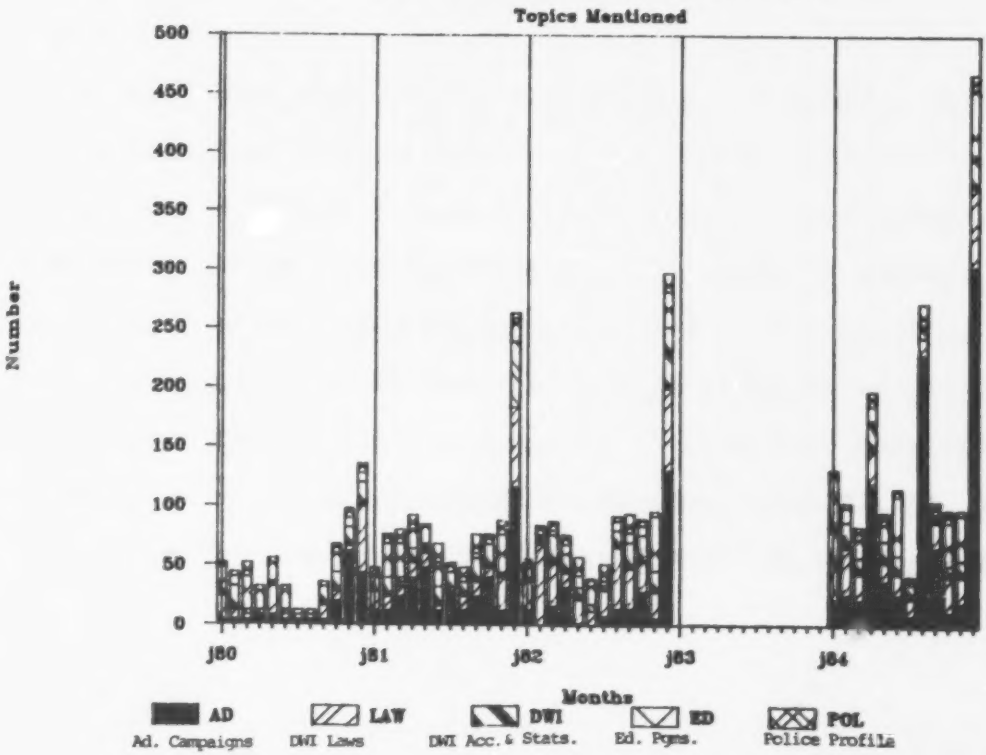


FIGURE 3

DWI Newspaper Clippings– B.C.



the highest frequencies generally occurring during the December periods.

Considering the patterns within the group categories illustrated in Table 1, in 1980 CounterAttack was mentioned in 47% of all drinking-driving print articles, while the figures for 1981-1984 were 41%, 20%, 14%, and 28% respectively, with a 5-year average of 27%. Figure 2 shows that CounterAttack was mentioned most frequently during the December CounterAttack roadcheck enforcement periods, although the 1984 August-September CounterAttack roadcheck enforcement period also produced frequent mention of CounterAttack in the press. M.A.D.D. was mentioned in 0% of the articles in 1980 and 1981, 5% in 1982, 11% in 1983 and 4% in 1984, producing a 5-year average of 6%. I.C.B.C. was mentioned in 2% of the clippings in 1980 and 1981, 6% in 1982, and 4% in 1983 and 1984, producing a 4% overall average. The R.C.M.P. group coding category was noted in 21% of the articles in 1980, and the figures for 1981 to 1984 were 24%, 24%, 13%, and 17% respectively, producing a 19% overall average. The Ministry of Attorney General was mentioned in 10% of the clippings in 1980, 9% in 1981, 12% in 1982, 5% in 1983, 4% in 1984, and 7% overall, and Other groups were mentioned in 20% in 1980, 24% in 1981, 33% in 1982, 47% in 1983, and 43% in 1984, giving an overall level of 37%. Finally, from Figure 2 it can be seen that, with

the exception of the previously mentioned CounterAttack police roadcheck drinking-driving enforcement periods, the proportional mentions of M.A.D.D., I.C.B.C., R.C.M.P., and Attorney General do not appear to vary to a great extent from month to month.

Turning to the frequency of press articles coded according to content areas, the yearly percentages of the 7 content areas can be found on Table 4 while the monthly frequencies of the content areas can be seen on Figure 3.

Clipping Codes and Alcohol-Related Casualty Accidents:

Figure 1 plots the monthly number of drinking-driving related press clippings from 1980-1984 against the monthly percentage of alcohol-related casualty accidents (multiplied by 30 in order to make the scales of the two lines comparable). Clearly, as the amount of press coverage increases, the proportion of alcohol-related accidents decreases, both in terms of any given month as well as across the entire time span.

Table 5 shows the Zero-Order and Partial Correlations between the monthly numbers of specific Content and Group codes and the monthly proportion of alcohol-related casualty traffic accidents. Partial Correlations controlling for the linear effect of an overall decrease in the monthly proportion of these accidents between 1980-1984 were calculated in order to better isolate the effects of the

TABLE 5
Number of Total Drinking Driving Articles for Contents and Groups Mentioned in British Columbia Newspaper Clippings, 1979 to 1984 (excluding 1983 for Contents): Zero Order and Partial Correlations Controlling for Time

VARIABLES	CORRELATION WITH # ALCOHOL		MONTHLY MEAN	STANDARD DEVIATION
	ZERO	PARTIAL		
TOTAL CLIPPINGS	-0.64 !	-0.48 !	148.70	99.40
TIME	-0.50 !	-	30.50	17.46
CONTENTS (N=48)				
# DWI Accidents	-0.33 +	-0.20 n	4.79	6.63
# DWI Stats.	-0.36 *	-0.31 +	10.72	8.79
# DWI Laws	-0.46 !	-0.34 +	22.79	18.36
# Educ. Programs	-0.33 +	-0.22 n	14.77	13.75
# Police Profile	0.04 n	0.22 n	8.21	4.55
# Ad. Campaigns	-0.44 *	-0.27 n	34.96	57.65
# Other	-0.66 !	-0.48 !	39.38	30.98
GROUPS (N=60)				
# CounterAttack	-0.41 !	-0.38 *	39.68	42.15
# M.A.D.D.	-0.47 !	-0.18 n	9.61	12.19
# I.C.B.C.	-0.25 n	-0.02 n	6.02	7.86
# R.C.M.P.	-0.47 !	-0.31 +	27.60	16.19
# Attorney-Gen.	-0.03 n	-0.01 n	10.48	8.94
# Other	-0.61 !	-0.43 !	55.30	49.91

NOTE: + = $p < 0.05$
* = $p < 0.01$
! = $p < 0.001$
n = Not Significant

TABLE 6
Percent of Total Drinking Driving Articles for Contents and Groups Mentioned in British Columbia Newspaper Clippings, 1979 to 1984 (excluding 1983 for Contents): Zero Order and Partial Correlations Controlling for Time

VARIABLES	CORRELATION WITH % ALCOHOL		MONTHLY MEAN	STANDARD DEVIATION
	ZERO	PARTIAL		
TOTAL CLIPPINGS	-0.64 !	-0.48 !	148.70	99.40
TIME	-0.50 !	-	30.50	17.46
CONTENTS (N=48)				
% DWI Accidents	-0.03 n	-0.02 n	3.29	4.10
% DWI Stats.	0.14 n	-0.02 n	9.10	6.31
% DWI Laws	0.03 n	-0.00 n	17.65	11.37
% Educ. Programs	0.15 n	0.04 n	12.17	10.50
% Police Profile	0.50 !	0.42 *	7.69	5.34
% Ad. Campaigns	-0.15 n	-0.01 n	20.04	16.92
% Other	-0.22 n	-0.17 n	30.05	13.57
GROUPS (N=60)				
% CounterAttack	0.17 n	-0.14 n	28.95	19.83
% M.A.D.D.	-0.27 +	0.14 n	4.85	5.85
% I.C.B.C.	-0.04 n	0.18 n	3.58	4.32
% R.C.M.P.	0.25 n	0.16 n	20.27	9.49
% Attorney-Gen.	0.22 n	0.11 n	8.78	8.79
% Other	-0.37 *	-0.11 n	33.56	16.21

NOTE: + = $p < 0.05$
* = $p < 0.01$
! = $p < 0.001$
n = Not Significant

numbers of articles within the month. That is, as can be seen from Figure 1, there is a general trend toward fewer accidents and more press coverage. By using Partial Correlations controlling for this general trend (as represented by the variable Time, which simply increases by 1 for each of the 60 months starting at 1 in January 1980 and increasing to 60 in December 1984), the effect of the number of drinking-driving related articles per month can be isolated from the general overall trend across the years.

Table 6 shows the Zero-Order and Partial Correlations between the monthly percentage of Group and Content codes and the monthly percentage of alcohol-related casualty and traffic accidents. The rationale for using Partial Correlations is similar to that of using them in Table 5. On the other hand, the monthly percentage of Group and Content codes was used (as opposed to the monthly absolute number) in order to remove the effects of simple increases in clipping volume. For example, the number of articles in a particular coding category could increase - perhaps during the Christmas roadcheck blitz - yet the percentage of the total number of articles that the coding category comprises might easily decrease because of a greater increase in the numbers in other coding categories. Thus, the relationship between these accidents and media content is best expressed by the Partial Correlations (which eliminate the general

trend across time) on the percentage figures (which eliminate the effects of simple numeric increases from month to month).

From Table 5 it can be seen that the single greatest predictor of a reduction in alcohol-related casualty traffic accidents is the total number of clippings per month, with a Zero-Order Correlation of -0.64 and a Partial Correlation of -0.48. Considering the group clipping codes, the Partial Correlation using Other Groups related most strongly to a reduction in these accidents (r=-0.43), followed by CounterAttack (r=-0.38) and R.C.M.P. (r=-0.31), while the M.A.D.D., I.C.B.C., and Attorney General codes did not relate to a statistically significant reduction in alcohol-related casualty traffic accidents when the overall trends were controlled for.

On the other hand, from Table 6 it can be seen that there were no statistically significant Partial Correlations between the monthly percentage of each group mentioned in the press and a reduction in the proportion of alcohol-related casualty accidents. Similarly, none of the content codes significantly predicted a reduction in these accidents.

DISCUSSION

This examination of print media in British Columbia from 1980-1984 shows that monthly increases in the number of articles on drinking driving related to decreases in the monthly percentage of alcohol-related casualty traffic accidents. However, the specific content of the articles and the groups or organizations mentioned in the articles did not relate to any reduction in these accidents.

The fact that the number of print articles in a month related to a reduction in alcohol-related casualty traffic accidents in that month can in part be explained by the third variable of the December CounterAttack roadcheck enforcement blitzes. That is, when these drinking-driving blitzes occur, they generate a large number of press articles that are blitz-specific, as well as a large number that are on drinking driving in general. Arguably, these articles increase drivers' perception of both the general dangers of drinking driving, as well as the specific threat of an increased probability of apprehension for drinking driving. Consequently there is less drinking driving and fewer alcohol-related traffic accidents. In any case, when controlling for the overall trends in press on drinking driving and drinking-driving accidents, the frequency of press mentions of CounterAttack and Other Content were the strongest predictors of alcohol-related casualty accident

reduction.

However, the monthly proportion of press content or monthly proportion of groups mentioned in drinking-driving articles failed to predict any monthly reduction in alcohol-related casualty traffic accidents. One possible explanation for this finding could be that, in a broader sense, there is very little difference between one press article on drinking driving and another. That is, while some articles mention one group or topic and others mention others, all of the articles condemn drinking driving and are therefore all essentially the same message. All of the groups coded from the articles - CounterAttack, M.A.D.D., I.C.B.C., R.C.M.P., Attorney General and "Other" - are saying that drinking driving is dangerous and illegal, so it really does not matter to the reader to which specific group the message is attributed (although it probably does matter to the groups and their supporters). Similarly, the article content codes developed for this study may be measuring differences that are too subtle to be meaningful or produce varying effects on the readers of the articles.

Finally, the overall trend of an increase in print articles on drinking driving and a decrease in the percentage of alcohol-related traffic accidents suggests that public attitude may be becoming less accepting of drinking driving, and consequently there are fewer drinking

drivers on the roads. Perhaps with continued enforcement and public education these attitude changes can be maintained to produce a long-lasting reduction in drinking-driving accidents.

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The Kamloops Experiment: Media Amplification of a 2-week Drinking-Driving Police Roadcheck Enforcement Campaign in a British Columbia Community

SUMMARY

In order for a police enforcement campaign to be effective in affecting drivers' behaviour, it is reasonable to assume that drivers must be made aware of the campaign. Police visibility and the laying of charges, while necessary for the campaign to exist at all, has not been sufficient to make the public aware of same. An attempt at media saturation and community involvement in the Kamloops area of British Columbia in publicizing a two-week, province-wide drinking-driving roadcheck police enforcement campaign brought the awareness of the campaign up to 51% in the Kamloops area, as opposed to an awareness level of only 16% in the remainder of the province. The total media cost for the Kamloops area was about $7,000, or perhaps 65% of the insurance costs of a single, injury-producing traffic accident. It consisted of paid radio and newspaper messages, and of supplying the community with posters and lapel stickers. In order to coordinate the publicity associated with the Kamloops area campaign, the Kamloops Steering Committee, representing a wide range of community groups was also formed.

The results of this study clearly show that paid media messages combined with community support constitute an effective method of making the public aware of a police drinking-driving enforcement campaign, and that the lack of paid media amplification of the police campaign will result in the public not being aware of the campaign. This, in turn, will probably result in the failure of the campaign to change the public's driving behaviours and thus there will probably be no reduction in associated traffic accidents.

In short, the simple fact of police presence and the unassisted media interest generated by same are not enough to make the public aware of a drinking-driving roadcheck enforcement campaign. Paid advertisement, preferably in conjunction with local community support, is necessary in addition to police efforts.

Table 1.
Telephone Survey Data

QUESTION	PRE-TEST		POST-TEST	
	Not Kam. (N=276)	Kam. Area (N=269)	Not Kam. (N=250)	Kam. Area (N=251)
Are you aware of any new drinking driving enforcement programs? % "yes"	8%	14%	16%	51%
Have you seen a DWI roadcheck in the last 2 weeks? % "yes"	11%	11%	22%	30%
Have you been stopped at a DWI roadcheck in the last 2 weeks? % "yes"	7%	3%	8%	15%
How did you hear about the new (DWI) program?				
% Television	1%	4%	6%	15%
% Radio	2%	4%	2%	14%
% Newspaper	3%	2%	2%	9%
% Word of Mouth	1%	1%	2%	2%
% Saw Police	0%	3%	3%	2%
% Poster	0%	0%	0%	4%
% Other	0%	0%	0%	3%

THE KAMLOOPS EXPERIMENT: MEDIA AMPLIFICATION OF A 2-WEEK DRINKING-DRIVING POLICE ROADCHECK ENFORCEMENT CAMPAIGN IN A BRITISH COLUMBIA COMMUNTIY

Between April 20 and May 21, 1984, the police in British Columbia mounted a province-wide drinking-driving roadcheck enforcement program or "blitz" which, by the time it was over, had checked 265,455 drivers, utilized 13,290 police hours, and been seen by 38% of the population over 15 years of age. However, this likely failed to reduce alcohol-related casualty accidents, and in fact, the general public was not even aware that a blitz was in progress. The most likely explanation for this unfortunate outcome was that there was insufficient media coverage of the fact of the blitz. That is, the public was not informed through a widespread media campaign that a blitz was on, did not have an increased perception of apprehension, and thus did not reduce their drinking driving (Mercer, 1982A). On the other hand, there is very strong evidence that when the public is made aware of the fact of a drinking-driving roadcheck enforcement campaign, the perceived likelihood of apprehension increases, drinking driving decreases, and drinking-driving accidents decrease (Mercer, 1985B; Ross, 1984). Indeed, this is probably the mechanism that makes the Christmas-New Year period in British Columbia the time of the lowest proportion of drinking-driving accidents of the entire year (Mercer, 1984). Finally, it has been established that simply increasing Driving While Impaired charges in no way reduces alcohol-related traffic accidents (Mercer, 1985B; Ross, 1984).

The question that arises from these findings is, "If the amount of media coverage of the 1984 April-May blitz was not enough to make any impact on the perceptions of the public, how much <u>is</u> enough?" It is the

purpose of this study to attempt to answer that question through the experimental manipulation of the extent of media coverage in a two-week, province-wide drinking-driving roadcheck enforcement campaign which ran from May 6 to May 20 in British Columbia.

METHOD

In the spring of 1985, the police in British Columbia mounted a two-week, province-wide "Spring CounterAttack" drinking-driving roadcheck enforcement campaign or "blitz". Running from May 6 to May 20, the campaign involved stopping every Nth driver using randomly-located roadchecks. If, in the course of the police interview with the driver, it was suspected that the driver was impaired he/she was charged with Driving While Impaired (DWI). The purpose of this enforcement campaign was twofold: first, to reduce drinking driving and the accidents associated with drinking driving through increasing the drivers' perceived likelihood of apprehension; and, second, to impress upon the public the seriousness of the crime of Driving While Impaired and the fact that the police actively pursue these criminals.

It should be mentioned that these campaigns are coordinated by the Police Advisory Committee (PAC) which is a committee of senior traffic officers representing all of the police jurisdictions of the province. This committee is sponsored by the Traffic Safety Education department of the Insurance Corporation of British Columbia (ICBC) through the CounterAttack program of ICBC and the Ministry of Attorney General.

However, as noted above, these sorts of police efforts appeared to produce little effect unless they were amplified by the media so that the public was made aware of the fact of the enforcement campaign. The extent

of the media amplification of the largely unsuccessful Spring 1984 drinking-driving enforcement campaign involved encouraging the police to contact local media, a government press release, and the production by the police of three, 30-second radio messages which were aired from time to time as public service announcements. Inasmuch as the Spring 1984 campaign failed to either reduce drinking-driving accidents or increase the perceived likelihood of apprehension for DWI, it was decided to attempt to increase the media amplification of the police presence for the Spring 1985 drinking-driving roadcheck campaign over the 1984 media levels. Because of limited resources, it was not considered practical to try to saturate the entire province with information on the enforcement campaign. Therefore, the "Kamloops Experiment" was devised: advertising efforts were divided between a broad advertising campaign throughout the province and a specific, intensive, community-based media campaign in the Kamloops area of the province.

Experimental Group Choice - - Kamloops Area:

The area chosen for the intensive media campaign was the Kamloops area in the central interior of the province. The City of Kamloops itself has a population of about 65,000 persons while the surrounding area policed by the RCMP (Kamloops Subdivision) contains an additional 80,000 persons. There were two reasons for this choice -- first, the Kamloops area has a reasonable mix of urban, suburban, town, and rural areas, making it roughly comparable to the province as a whole, and second, the proportion of alcohol-related casualty traffic accidents in this area has been virtually identical to the proportion for the entire province for the past two years, again making the Kamloops area a reasonable candidate for this experiment,

using the remainder of the province as a comparison group.

Public Awareness Campaign:

The public awareness component of the May 6-20 blitz involved the province-wide efforts to publicize the drinking-driving enforcement campaign and the Kamloops area-specific efforts.

Considering the media efforts to publicize the campaign that applied to the province as a whole, these involved the following:

1. Running a repeating "crawl" across the bottom of the existing CounterAttack anti-drinking driving television commercials. These commercials are run several times a day during prime viewing time throughout the year. However, the crawl ran from two weeks prior to the campaign till the end of the campaign. It read "Police Roadcheck in Your Area, May 6-20". Production cost: $2,000.

2. Press releases of the Ministry of Attorney General, ICBC, and the police announcing the campaign.

3. The production of 10,000 posters reading "We Support Spring CounterAttack against Drinking Driving, May 6-20. Roadchecks will be in this area." The posters were distributed to all police detachments, liquor store outlets, ICBC offices, members of the B.C. Pub Association (N=200), members of the Restaurant and Food Association through their newsletter, all public health nurses, civic bodies and schools throughout the province. Production cost: $3,000.

4. The distribution of newspaper-filler "clipsheets" to the press through the local police detachments throughout the province. These clipsheets consisted of variously-sized messages, indicating the dates of the program, to be used as fillers in newspapers. Production cost: $500.

5. Police spokesmen contacted the media in their local areas to publicize the campaign through newspaper, radio, and television interviews.

In addition to the above, in the Kamloops area the following efforts were put forward to inform the driving public about the campaign:

1. Mr. M. McCarthy, Vice-President of ICBC, announced the "Kamloops Experiment" at a Chamber of Commerce luncheon, April 25.

2. From April 29 to May 20, local radio stations ran daily paid advertisements for the campaign (7 per day in total). Cost: $3,000.

3. The two local newspapers ran paid advertisements announcing the campaign (4 ads in total). Cost: $1,200.

4. A banner advertising the campaign was produced and hung over a main street. Cost: $500.

5. Ten thousand lapel stickers with "Let's back Kamloops CounterAttack" were produced. Cost: $2,000.

6. A local steering committee was formed. The members of this committee consisted of representatives from ICBC, the Insurance Agents, the Ministry of Attorney General, the police, the City of Kamloops, and members of the ICBC Traffic Safety Education Department "Network" of School, Health, and Workplace coordinators. A partial list of the projects publicizing the campaign carried out by the steering committee includes

- distributing posters and lapel stickers,
- putting information on the campaign into a local employer's pay cheques, and
- setting up signs along well-travelled routes advertising the campaign.

Measuring Effects:

In order to assess both the effectiveness of the province-wide as well as the Kamloops area media campaigns of informing the driving public of the fact of the drinking-driving enforcement campaign, telephone surveys were conducted by the research firm of Campbell Farrell & Associates, using an interview schedule developed by the CounterAttack program. There was a pre-campaign survey of both the entire province and the Kamloops area, as well as a post-campaign survey of the entire province and the Kamloops area. The respondents for these surveys were randomly selected persons over 15 years of age (50% male, 50% female), and each survey questioned about 250 people, which gives an error margin of about 5% (p=.05). Each survey asked a series of questions concerning, among other things, awareness of the campaign, the sources of that awareness, whether or not they had seen and/or been stopped at a police roadcheck within the previous two weeks, and to name any groups associated with trying to reduce drinking driving.

In addition to the telephone survey's objective measure of success of the "Kamloops Experiment", a more subjective assessment of the Kamloops area campaign, and in particular of the community involvement aspects of the campaign, was obtained from a de-briefing and assessment meeting of the Kamloops steering committee held directly after the campaign.

Finally, regarding figures on accidents, charges, numbers of drivers stopped in roadchecks and so on, it is statistically unsound to use these figures to draw any final conclusions about the effects of the enforcement and media campaign on the Kamloops area. The reason for this is that, due to the relatively short duration of the enforcement campaign (2 weeks), the total number of alcohol-related accidents in the Kamloops area is too small to show any reliable effects. That is, any change from pre-campaign Kamloops accident levels to post-campaign Kamloops accident levels or from 1984 levels to 1985 levels could as easily be due to random elements such as weather, as they could be due to the effects of the campaign. Therefore, these data are not included.

RESULTS

Telephone Survey Data:

From Table 1 it can be seen that, excluding the Kamloops area, provincially 8% of those interviewed in the telephone survey before the two-week drinking-driving roadcheck campaign indicated they had heard of a new drinking-driving enforcement campaign, while directly after the campaign 16% indicated that they had heard of a new drinking-driving campaign. This increase in the public's awareness of the campaign was large enough to be moderately statistically significant (Chi-square = 5.3, d.f. = 1, $p = .05$). However, the increase from 14% awareness before the

Table 1.
Telephone Survey Data

QUESTION	PRE-TEST		POST-TEST	
	Not Kam. (N=276)	Kam. Area (N=269)	Not Kam. (N=250)	Kam. Area (N=251)
Are you aware of any new drinking driving enforcement programs? % "yes"	8%	14%	16%	51%
Have you seen a DWI roadcheck in the last 2 weeks? % "yes"	11%	11%	22%	30%
Have you been stopped at a DWI roadcheck in the last 2 weeks? % "yes"	7%	3%	8%	15%
How did you hear about the new (DWI) program?				
% Television	1%	4%	6%	15%
% Radio	2%	4%	2%	14%
% Newspaper	3%	2%	2%	9%
% Word of Mouth	1%	1%	2%	2%
% Saw Police	0%	3%	3%	2%
% Poster	0%	0%	0%	4%
% Other	0%	0%	0%	3%

campaign to 51% after the campaign in the Kamloops area is a much greater increase than that for the rest of the province and is statistically a very significant change (Chi-square = 109.6, d.f. = 1, p = .000).

Concerning whether or not those interviewed had seen a drinking-driving roadcheck within the two weeks previous to the interview, the province, excluding the Kamloops area, increased from 11% "yes" to 22% "yes" (Chi-square = 14.1, d.f. = 1, p = .000), while the Kamloops area went from 11% to 30% (Chi-square = 28.6, d.f. = 1, p = .000). Again, while both changes are statistically significant, the Kamloops area change is greater in magnitude.

On the other hand, while there was a statistically significant increase in the number of persons in the Kamloops area who said they had been stopped in a roadcheck within the previous two weeks (pre-campaign = 3%, post-campaign = 15%, Chi-square = 22.8, d.f. = 1, p = .000), there was no significant increase for the remainder of the province (pre-campaign = 7%, post-campaign = 8%, Chi-square = 0.5, d.f. = 1, p = not significant).

Source of Awareness:

Each survey respondent who indicated that they had heard of a new drinking-driving enforcement campaign was asked how they heard of the campaign and given the opportunity to list up to three different sources. The totals of these responses as a proportion of the sample size are given in Table 1.

Television showed a statistically significant increase as a source of information and was the primary source of information about the campaign for both the Kamloops area (pre-campaign = 4%, post-campaign = 15%,

Chi-square = 16.0, d.f. = 1, p = .000) and the remainder of the province (pre-campaign = 1%, post-campaign = 6%, Chi-square = 10.6%, d.f. = 1, p = .000). On the other hand, while radio was a statistically significant important source of information in the Kamloops area (pre-campaign = 4%, post-campaign = 14%, Chi-square = 18.2, d.f. = 1, p = .000) it did not show a statistically significant increase as a source of information for the remainder of the province (pre-campaign = 2%, post-campaign = 2%, Chi-square = 0.1, d.f. = 1, p = not significant). Similarly, the newspapers were frequently cited in the Kamloops area as a source of information about the campaign, and this frequency of citation showed a statistically significant increase in the post-campaign survey (pre-campaign = 2%, post-campaign = 9%, Chi-square = 13.6, d.f. = 1, p = .000) while in the rest of the province it was neither cited frequently, nor showed a statistically significant gain after the campaign (pre-campaign = 3%, post-campaign = 2%, Chi-square = 001, d.f. = 1, p = not significant).

Although the other sources of news about the campaign were cited too infrequently to allow statistical tests to be carried out, a few points should be noted. Very few people said that they had heard of the campaign by seeing the police or by hearing about it from others. Posters in the Kamloops area informed the same proportion of people about the campaign as did the sum of radio and newspapers in the rest of the province, while "other" sources in the Kamloops area, such as signs, informed a higher proportion than either radio or newspapers in the rest of the province.

Anti-Drinking-Driving Groups:

Each respondent to the survey was asked if he/she could name any

Table 2.
Telephone Survey Data

QUESTION	PRE-TEST		POST-TEST	
	Not Kam. (N=276)	Kam. Area (N=269)	Not Kam. (N=250)	Kam. Area (N=251)
Can you name any anti-drinking driving groups? (up to 3 groups per respondent)				
% BCAA	1%	1%	0%	0%
% ICBC	1%	0%	2%	0%
% The Government	5%	9%	6%	3%
% CounterAttack	3%	5%	2%	6%
% The Police	9%	15%	7%	11%
% MADD	57%	46%	49%	44%
% Citizen Groups	1%	1%	1%	1%
% AA	2%	2%	2%	0%
% Labatts	1%	0%	0%	0%
% Broadcaster's Assn.	8%	8%	4%	4%
% Other	19%	20%	15%	29%
% Unable to name a single group	32%	35%	42%	32%

groups campaigning against drinking driving, and if they could, they were asked to name up to three. By comparing pre-campaign and post-campaign responses, it was hoped that it could be determined whether or not the campaign was associated with any particular group. Table 2 shows those groups mentioned by at least 1% of the four samples (i.e., Kamloops pre-campaign, Kamloops post-campaign, remainder of the province pre-campaign, remainder post-campaign). An examination of Table 2 indicates that the campaign did not appear to raise the prominence of any particular anti-drinking-driving group.

Kamloops Steering Committee Data:

As local community participation was considered to be a major component in the success of promoting the campaign, many of the members of the Kamloops Steering Committee met directly after the campaign to discuss how it might have been improved. In addition to out-of-town representatives of the Ministry of Attorney General and ICBC, there were 11 members of the local committee present, representing: the ICBC Traffic Safety Education Workplace, Health, Schools, and Civic "Network"; the City of Kamloops; the RCMP Kamloops City Detachment; and the Independent Insurance Agents. While there was general agreement that the community response to the campaign was "positive", there were a number of areas that "needed improvement". In particular, three critcisms were central to the discussions: first, seven people (64%) expressed a strong need for more materials, especially lapel stickers, posters, and campaign-specific television advertisements; second, six people (55%) complained of a lack of organization; and third, five people (45%) wanted more "lead time" to organize. It should be noted that, while these complaints were not

actively spoken to by all Steering Committee members, there was a general agreement that lack of materials, organization, and lead time were problems.

DISCUSSION

The central question of this research has to do with how the driving public can be made aware of police enforcement campaigns. Research indicates that, once the public is aware of an enforcement campaign, drivers will avoid the violations associated with the campaign so as not to be apprehended. This in turn can reduce the accidents associated with these violations.

The "Kamloops Experiment" was an attempt to saturate the Kamloops area of British Columbia with information on a province-wide, two-week drinking-driving police roadcheck enforcement campaign in order to measure the effects of this saturation on the public's awareness of the campaign. This section of the paper deals with the effects of police visibility, the frequency of laying charges, television messages, radio messages, newspaper articles and community support on the public's level of awareness of the campaign. Finally, conclusions on the effectiveness of the different approaches are drawn.

Police Visibility and Charge Frequency:

From these results it is clear that police presence and charge frequency are not sufficient to convey the fact of an enforcement campaign. In the Kamloops area 51% of those interviewed in the post-campaign telephone survey indicated that they were aware of the drinking-driving enforcement campaign, 30% said they had seen a police

roadcheck during the time of the campaign (i.e., previous two weeks), and only 2% said they were aware of the campaign because they had seen a roadcheck. In the remainder of the province, 16% were aware of the campaign, 22% had seen a police roadcheck, and only 2% said they were aware of the campaign from seeing a roadcheck. Finally, not one person interviewed (0%) said they were aware of the campaign from being stopped by the police, or from being charged for Drinking While Impaired, or being charged for anything else.

If police presence and police charging violators are not enough to tell the public that there is an enforcement campaign on (and therefore influence their driving behaviors), what is the most cost-effective manner of amplifying the fact of an enforcement campaign?

Television:

Television was the only medium to produce a statistically significant increase in awareness of the campaign in both Kamloops area and in the remainder of the province, with 15% citing it as a source for their awareness of the campaign in the Kamloops area and 6% in the rest of the province. Television was also the most frequently cited source of campaign awareness in both groups.

Although it is impossible to know what proportion of the television-induced campaign awareness came from the province-wide "crawl" across the CounterAttack advertisements (produced at a cost of $2,000.) and local television news and public service commentary on the campaign, it can be argued that the difference between the 15% citing television in the Kamloops area and the 6% in the remainder of the province is in some part due to local Kamloops television. In turn, the coverage of the Kamloops campaign by local television can in part be attributed to the work of

the Kamloops Steering Committee, which arranged television interviews and messages on the campaign, and in part to the cooperation of the local television media.

Radio:

Radio was a statistically significant source of information about the fact of the campaign only in the Kamloops area, where it was cited by 14% of those interviewed (as opposed to being cited by only 2% in the remainder of the province). A total of $3,000 was spent on radio messages on the campaign in Kamloops, with seven messages being broadcast daily across four local stations. As with the Kamloops television coverage, some portion of the radio coverage above and beyond the paid messages was due to the Kamloops Steering Committee and the cooperation of the local radio stations.

Finally, it should be emphasized that, even though the police throughout the province were encouraged to contact the radio stations in their areas to publicize the campaign, and in fact reported doing so, radio was a significant carrier of information on the campaign only in the Kamloops area.

Newspapers:

The print media was a statistically significant source of awareness of the enforcement campaign in the Kamloops area only (9%), where four advertisements announcing the campaign were placed in the two local newspapers at a cost of $1,200. As noted above concerning radio, the police in the remainder of the province contacted their local nmewspapers about the campaign, yet this failed to produce a significant awareness of same -- only 2% in the remainder of the province cited newspapers as a

source of awareness of the campaign. Also, as noted for radio, some portion of the 9% citing newspapers in the Kamloops area was probably due to the efforts of the Steering Committee and the cooperation of the local newspapers.

Community Support:

It is difficult to exactly measure the contribution of community support to a police drinking-driving roadcheck enforcement campaign such as this one. Certainly, the 4% of those in the Kamloops area who became aware of the campaign through posters and the 3% who became aware in "other" ways can be directly attributed to the efforts of the Kamloops community. Students businessmen, and others displayed the posters that were supplied to them, while the municipality erected signs and banners, the latter with some financial assistance ($500). In particular, it is noteworthy that in the remainder of the province 0% cited "other" and 0% cited "posters" as sources of information on the campaign, even though posters and information fliers were sent to a wide range of organizations throughout the province including all police detachments, ICBC offices, liquor store outlets and so on.

Not only can the Kamloops community, and especially the Kamloops Steering Committee, take credit for the 7% awareness sources of "poster" plus "other" -- which is more than the total for "television" in the rest of the province -- the Kamloops community can also take some credit for the high levels of local media coverage of the campaign, as noted above. Nonetheless, the evaluation of the community contribution done by the Kamloops Steering Committee indicated that there was a lack of materials to publicize the campaign, a lack of lead-time to organize their efforts, and

an overall lack of organizational structure through which to direct their efforts. Arguably, while the contribution of the community support for this enforcement campaign was considerable, it could have been much greater had the community been given more time, more help in coordination, and more financial support.

Conclusions:

In order for a police enforcement campaign to be effective in affecting drivers' behaviour, it is reasonable to assume that drivers must be made aware of the campaign. Police visibility and the laying of charges, while necessary for the campaign to exist at all, has not been sufficient to make the public aware of same. An attempt at media saturation and community involvement in the Kamloops area of British Columbia in publicizing a two-week, province-wide drinking-driving roadcheck police enforcement campaign brought the awareness of the campaign up to 51% in the Kamloops, area as opposed to an awareness level of only 16% in the remainder of the province. The total media cost for the Kamloops area was about $7,000, or about 65% of the insurance costs of a single casualty-producing traffic accident. It consisted of paid radio and newspaper messages and supplying the community with posters and lapel stickers. In order to coordinate the publicity associated with the Kamloops area campaign, the Kamloops Steering Committee representing a wide range of community groups was also formed.

The results of this study clearly show that paid media messages combined with community support constitute an effective method of making the public aware of a police drinking-driving enforcement campaign, and that the lack of paid media amplification of the police campaign will result in the public not being aware of the campaign. This, in turn, will

probably result in the failure of the campaign to change the public's driving behaviours and thus there will probably be no reduction in associated traffic accidents.

In short, the simple fact of police presence and the unassisted media interest generated by same is not enough to make the public aware of a drinking-driving roadcheck enforcement campaign. Paid advertisement, preferably in conjunction with local community support, is necessary in addition to police efforts.

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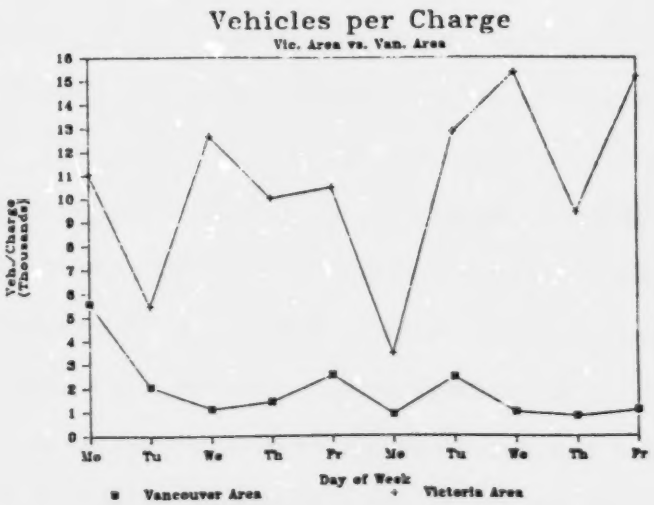
The Effects of Media Amplification of Police Presence in a 2-week Intersection Enforcement Campaign

SUMMARY

The results of this study indicate that the newspaper and radio media campaign carried out by the Victoria Area police to publicize their two-week intersection enforcement campaign was effective in conveying the fact of the campaign to the public, substantially reducing intersection violations, and in changing the nature of the violations that did occur. Had the Victoria Area enforcement campaign proceeded without the media campaign, it would have produced five times the number of charges at an estimated additional cost of $44,000.00 in justice system and administrative expenses. As the cost of the media campaign did not approach 1% of these estimated savings, it follows that extensive use of the media to publicize and amplify police enforcement efforts can be a cost-effective method of, at least for a short period, reducing the frequency of driving violations without substantially increasing justice system costs.



THE EFFECTS OF MEDIA AMPLIFICATION OF POLICE PRESENCE IN A 2-WEEK INTERSECTION ENFORCEMENT CAMPAIGN

Enforcing traffic laws is an expensive business. For example, in British Columbia it has been estimated that every time the police lay a Driving While Impaired (DWI) Charge, the government commits itself to spending about $1,000.00 in justice system costs, while the cost of an hour of a single traffic officer's time in British Columbia is approximately $34.00 (Mercer, 1984). As the ability of the justice system to carry these costs may well be approaching its limit, techniques need to be developed in order to reduce traffic violations (and presumably to reduce traffic accidents with this) without substantially increasing policing costs.

One such approach is to amplify the extent of police activity through the use of the media, thereby increasing the potential law-breaker's perceived likelihood of apprehension, in turn reducing his/her likelihood of breaking the law. Assuming that media costs were kept to a minimum through the use of public service announcements and the like, this amplification of police activity could be very cost-effective in reducing both violations and traffic accidents.

Regarding the traffic enforcement area of drinking-driving, there is correlational and quasi-experimental evidence that the effectiveness of police presence in reducing alcohol-related traffic accidents is enhanced by media amplification of this presence (Mercer, 1985a, Ross, 1984). Clearly, the more the general public is made aware that a police crackdown or "blitz" is in progress, the more the general perceived likelihood of apprehension will increase and thus the more the target behaviour of drinking driving will, presumably, decrease. It may follow then that media

amplification of police activity can have a crucial role in the success or failure of enforcement campaigns in general. Therefore it is the purpose of this paper to pursue this notion through the experimental manipulation of media surrounding two police "blitzes" involving intersection enforcement.

METHOD

The most densely populated and urban areas of British Columbia are located at the mouth of the Fraser River in and around the City of Vancouver (i.e. the "Lower Mainland") and at the south-east end of Vancouver Island in and around the City of Victoria. It has been shown that over half of all urban casualty accidents in the province occur at intersections (Mercer, 1985b), and because of this the task of reducing intersection violations and accidents has become a central issue for the police in these areas. Pursuant to this, five police groups in the lower mainland (i.e. Vancouver City, North Vancouver RCMP, Surrey RCMP, Richmond RCMP and Burnaby RCMP) and five police groups in the Victoria area (i.e. Colwood, Esquimalt, Central Saanich, Saanich and Victoria City) decided to participate in a two-week intersection enforcement campaign from March 18 to 31, 1985.

The intersections chosen for this enforcement campaign all fit the following criteria: high accident rates; high traffic volume; and high visibility of and for police. For each intersection and enforcement period records of times, traffic flow, and charges laid were collected.

In order to experimentally manipulate the degree of media coverage, the Vancouver area police groups did not inform the local media about the two-week campaign, while the Victoria area police vigorously publicized the campaign through contacts in the local press and radio stations. It should be noted that televising coverage of the blitz was not actively pursued, as the broadcast range of that medium would have covered both the Victoria and Lower Mainland areas.

Finally, the public's perception of police enforcement efforts was measured before and after the campaigns in each area. This was done by the research firm of Campbell, Farrel & Associates through four telephone surveys (Pre-Victoria, Post-Victoria, Pre-Lower Mainland, Post-Lower Mainland), each of approximately 250 randomly chosen persons over 16 years of age, half of them male and half female. The standard error for this sampling is about 5% at the .05 level of probability. More specifically, questions centered on any noted changes in police visibility, the location of the changes, and the source of information concerning the changes.

Unfortunately, just before the campaign was to begin and after Campbell, Farrell & Associates had carried out the pre-campaign survey and had determined the sampling for the post-campaign survey, Vancouver City Police, the largest policing group in the Lower Mainland, were forced to drop out of the program. This resulted in only 6 intersections in the Lower Mainland being used, as opposed to 27 intersections in the Victoria area, and this in turn substantially reduced the usefulness of the Vancouver area surveys. That is, about half of those surveyed in the Vancouver area were living in Vancouver City and thus would not likely be

exposed to increased intersection enforcement activity. In short, the Vancouver area survey data might best be considered as representing a "moderate enforcement, no media" measure of public perception, as opposed to "blitz-level enforcement, no media". However, it should also be noted that the police-collected data on charges and so on are comparable between the Vancouver and Victoria areas, irrespective of the lack of participation by the Vancouver City Police.

RESULTS AND DISCUSSION

TELEPHONE SURVEY DATA:

Knowledge of Campaign: From Table 1 it can be seen that before the enforcement campaign 7% of those surveyed in the Vancouver Area and 11% of those surveyed in the Victoria area indicated that they had heard of a new intersection enforcement campaign. As no such campaign had been announced in either area, these figures represent a base level of the "aqueiscence response set" - - that is, the tendency for people to agree with a statement, irrespective of whether or not they have any views or knowledge on the issue. Indeed, all of the positive responses on the pre-test can be seen as a manifestation of this common psychological tendency.

The figures in Table I for the Vancouver Area survey during the week following the campaign (Post-Test) show that 13% indicated that they were aware of a new intersection enforcement campaign. However, it would not necessarily be correct to assume that in fact there was a rise in the number knowing of a campaign from 7% to 13%, and the reasons for this are as follows: First, because of the Vancouver City Police being unable to

Table 1.
Telephone Survey Data

QUESTION	PRE-TEST		POST-TEST	
	Vancouver (N=251)	Victoria (N=252)	Vancouver (N=263)	Victoria (N=238)
Are you aware of any new intersection enforcement programs?				
% "yes"	7%	11%	13%	42%
% "maybe"	89%	88%	87%	57%
% "no"	4%	2%	0%	1%
How did you learn of this program?				
Television	3%	2%	4%	9%
Radio	2%	5%	2%	26%
Newspaper	1%	2%	4%	17%
Saw Police	1%	3%	3%	10%
Word of Mouth	3%	4%	3%	4%
Received Ticket	0%	1%	1%	1%
Other	2%	2%	2%	2%

Table 2.
Summary of Police Data

VARIABLE	VANCOUVER AREA	VICTORIA AREA
# Intersections	6	29
# Hours	81	154
# Total Vehicle Flow	11,746,620	23,323,608
# Charges Laid	588	209
% red light	32%	20%
% yellow light	28%	47%
% speeding	2%	11%
% turn-related	31%	8%
% follow too close	0%	5%
% other	7%	9%
Charges per Hour	7.3:1	1.4:1
Vehicles per Charge	19,977:1	111,596:1
Vehicles per Hour	145,020	151,452
Media Contacts		
# print	0	12
# radio	0	34
# television	0	1

participate and because only 6 intersections were used in the Vancouver Area entire, it is not likely that many of those surveyed after the campaign actually had the opportunity to have seen the police at intersections. This fact supports the notion that a good portion of the 13% who said they were aware of the campaign were simply saying "yes" in order to please the interviewer (aqueiscense response set). Second, any random sampling of people for interviews will produce some amount of error in survey results. With the sampling size used for the Victoria and Vancouver areas, there is an error factor of about 5% in either direction. Therefore a pre-campaign 7% "yes" response to the question "Are you aware of any new intersection enforcement programs?" is, with a 5% error, very similar to a post-campaign "yes" response of 13%. Nonetheless, a statistical test (Chi-Square=11.1, d.f.=2, p=.004) indicated that there was a statistically significant increase in the numbers of people aware of the campaign in the Vancouver Area. This in turn can be attributed to the possibility that they learned of the Victoria Area campaign and thought it applied to the Vancouver Area, that they saw the police at intersections in the Vancouver Area, or both.

On the other hand, the increase of "yes" responses in the Victoria area from 11% before the campaign to 42% after the campaign indicates a real and substantial increase in knowledge of the campaign (Chi-Square= 63.7, d.f.=2, p=.000).

Source of Knowledge: Again from Table 1, it can be seen that, when given up to three opportunities to respond to the question "How did you learn of this program?", there was very little difference in the media sources cited before and after the Vancouver Area intersection enforcement campaign. In

fact, a statistical test shows that, for all intents and purposes, there were no differences between the Vancouver Area pre-test sample and the Vancouver Area post-test sample in their responses (Chi-Square=5.2, d.f.=6, p=Not Significant).

However, regarding the source of their knowledge of the campaign, after the campaign those in the Victoria Area most frequently cited "Radio" (26%), followed by "Newspapers" (17%), "Saw the Police" (10%) and "Television" (9%). Statistically, there was a significant change in the pattern of referring to media sources for knowledge of a campaign before and after the Victoria Area campaign (Chi-Square=14.2, d.f.=6, p=.05).

This change in the pattern of responses, combined with the substantial increase in "yes" responses to the question on knowledge of the campaign, argues strongly that the Victoria Area police's efforts to publicize the campaign were very effective. In particular, the effect of the media can be illustrated by noting that after the campaign, only 10% said that they were aware of the campaign through having seen the police, while 26% cited the radio and 17% cited the newspaper as the source of their information. However, this is not to imply that the police were not visible, as only 3% said they had seen the police at intersections before the campaign, while 10% said they had seen them after. Nonetheless, clearly the public knew about the campaign primarily from media sources.

POLICE DATA:

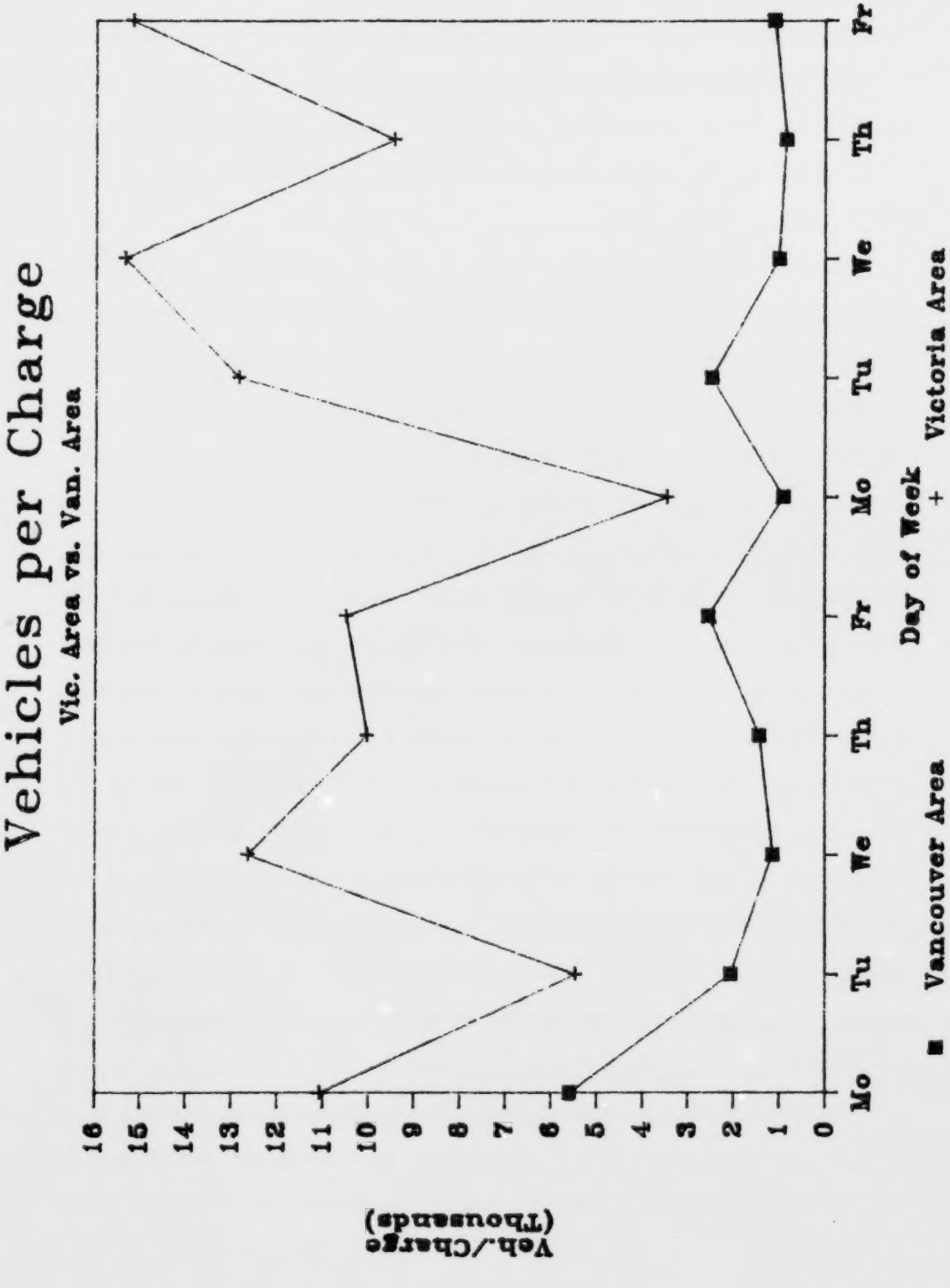
The above analyses show that in the Vancouver Area the public were not particularly aware of the intersection campaign and in the Victoria Area they were widely aware of the campaign, and that that awareness came primarily from the media, not from police visibility per se. However, did

this awareness produce any effect on their intersection-related driving habits? Assuming that there were no large and systematic differences between the Victoria and Vancouver Areas in terms of intersection selection criteria and police enforcement practices, inferences can be drawn from police-reported charge frequencies and patterns as to the effects of the media on the public's driving behaviours.

Table 2 is a summary of the police-reported data, and shows that while traffic flow per hour through the Vancouver Area intersections was similar to the flow through the Victoria Area intersections (145,020 vehicles per hour vs. 151,452/hr.), the Vancouver Area police charged 7.3 vehicles per hour, (19,977 vehicles per charge) whereas the Victoria Area police charged only 1.4 vehicles per hour (111,596/charge). Further, Figure 1 illustrates the number of vehicles passing through the intersection per charge laid for both areas by the day of the week, and suggests that there is very little cumulative effect of police presence alone (Vancouver Area line) while the media amplification of police presence may well have a cumulative effect (Victoria Area line). Very clearly, the Victoria Area police did not feel compelled to lay charges as frequently as did the Vancouver Area police. One way of putting these differences into perspective is that, if the Victoria Area police had had to charge at the rate of the Vancouver Area police, they would have laid an additional 881 charges, which at a nominal $50.00 per charge in administrative and justice system costs, would have amounted to an expenditure of an additional $44,000.00.

The widespread knowledge of the intersection enforcement campaign in the Victoria Area appeared to affect the pattern of violations as well as the frequency. Comparing the patterns of violations, as reflected in the

FIGURE 1


Vehicles per Charge
Vic. Area vs. Van. Area
Veh./Charge (Thousands)
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
Mo
Tu
We
Th
Fr
Mo
Tu
We
Th
Fr
Day of Week
Vancouver Area
Victoria Area

patterns of charges, between the Vancouver and Victoria areas, substantial and statistically significant differences appear, especially with regard to the yellow-light and turn-related categories (overall pattern Chi-Square=119.8, d.f.=6, p=.000). To illustrate, in the Vancouver Area, 28% of the charges involved yellow-light violations and 31% were turn-related (e.g.improper turn, failure to yield, etc.), while the figures for the Victoria Area were 47% and 8% respectively. Regarding these differences, it can be argued that, in an area where much of the driving population is aware of an intersection enforcement campaign, drivers will be relatively cautious about violations around intersections, and will not deliberately break the law. Thus, not only will there be fewer violations, the violations that do occur will be those involving split-second decisions such as whether or not to proceed through a changing light. However, where there is little or no increased perceived likelihood of apprehension, then there will not only be a higher rate of violations, but also a wider range of violations, as can be seen in the Vancouver Area data.

CONCLUSIONS:

Unfortunately, the relatively narrow geographic scope and brief duration of the intersection enforcement campaigns made it statistically impractical to try to measure any difference in intersection accident rates between the media campaign/no media campaign areas of Victoria and Vancouver. That is, the absolute number of intersection accidents during a two-week period at the intersections chosen is small enough that one could not determine if any differences found were due to the campaign or due to random variations in accidents and other, non-enforcement-related influences such as weather and the like.

Nonetheless, these results indicate that the newspaper and radio media campaign carried out by the Victoria Area police to publicize their two-week intersection enforcement campaign was effective in conveying the fact of the campaign to the public, substantially reducing intersection violations, and in changing the nature of the violations that did occur. Had the Victoria Area enforcement campaign proceeded without the media campaign, it would have produced five times the number of charges at an estimated additional cost of $44,000.00 in justice system and administrative expenses. As the cost of the media campaign did not approach 1% of these estimated savings, it follows that extensive use of the media to publicize and amplify police enforcement efforts can be a cost-effective method of, at least for a short period, reducing the frequency of driving violations without substantially increasing justice system costs.

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SECTION 3

DRIVERS' CHARACTERISTICS AND ACCIDENTS

Five Driver Licence Categories: Drivers' Age, Traffic Convictions and Traffic Accidents.
British Columbia, June 1980 - December 1984

Age v.s. Driving Experience as Predictors of Young Driver's Traffic Accident Involvement

Casualty Accidents Including Vehicles Registered Out-of-Province.
British Columbia, 1984

Convicted Drinking Drivers: Sex, Age, Other Traffic Convictions and Traffic Accidents.
British Columbia, June 1980 - December 1984

SUMMARY

In sum, the results of these analyses suggest that the situation is one of the impaired problem driver as opposed to the impaired driver problem. That is, when compared to drivers who have not been convicted of Driving While Impaired, those convicted of DWI have had about twice as many other driving-related convictions and over twice the number of reported traffic accidents. On the whole, convicted drinking drivers appear to be relatively dangerous drivers who also consume alcohol. From this it follows that drinking driving countermeasures might be best associated with a broad spectrum of driver training and education that includes, but is not limited to, information on alcohol.

TABLE 5
DWI Convictions by Recorded Convictions (Not DWI)
British Columbia, June, 1980 - December, 1984

# DWI Conv.	Recorded Convictions (Not DWI)						
	0 Conv.	1 Conv.	2 Conv.	3 Conv.	4 Conv.	5+ Conv.	TOTAL %
0 DWI Conv.	60.0	17.5	8.4	5.0	2.9	6.2	100.0
1 DWI Conv.	21.7	20.4	14.5	10.6	6.4	26.4	100.0
2+ DWI Conv.	19.6	15.2	13.0	8.7	13.0	44.1	100.0

TABLE 12
DWI Convictions by # Recorded Traffic Accidents: Row Percentages
British Columbia June 1980 - December, 1984

# DWI Conv.	# Recorded Traffic Accidents (Accd.)				
	0 Accd.	1 Accd.	2 Accd.	3+ Accd.	TOTAL (%)
0 DWI Conv.	79.1	16.0	3.6	1.3	100%
1 DWI Conv.	49.4	28.9	14.5	7.2	100%
2+ DWI Conv.	39.1	41.3	17.4	2.2	100%

CONVICTED DRINKING DRIVERS: SEX, AGE, OTHER TRAFFIC CONVICTIONS, AND TRAFFIC ACCIDENTS. BRITISH COLUMBIA, JUNE 1980 - DECEMBER, 1984

It is conservatively estimated that in the United States, alcohol is involved in about 8% of property damage only traffic accidents, 17% of non-fatal injury producing traffic accidents, and 55-58% of all fatal accidents (Fell, 1983), making it a serious and major contributor to the overall frequency of these accidents. On the other hand, drinking and driving does not inevitably lead to a traffic accident nor to being charged by the police with Driving While Impaired (Ross, 1984, 1985). To illustrate, in British Columbia, Canada, a night-time survey indicated that about 1 in 4 of the drivers tested had a blood alcohol content (BAC) of .02 mg./100 ml. or greater, and about 1 in 17 were over the legal limit of .08 mg./100 ml. (Mercer, 1982), yet with a driving population of about 2,000,000 and an alcohol-related casualty accident rate of about 4,800 accidents per year, the odds of a given driver having an alcohol-related casualty accident in a given day are about one in 154,000. Similarly, with an average British Columbia Driving While Impaired charge rate of about 20,000 per year, the chances of a given driver being charged with DWI on a given day are about one in 36,400. Clearly, there is probably more than the simple fact of alcohol consumption producing alcohol-related traffic accidents and producing DWI charges.

In 1977, in his article "The Impaired Driver Problem vs. the Impaired Problem Driver", Simpson pointed out that alcohol-related traffic accidents can be conceptualized from at least two different positions: the first suggests simply that alcohol consumption impairs the driver and thus traffic accidents occur, while the other position suggests that these

accidents are caused by problem drivers who also consume alcohol. Since that time research has shown that there are important differences between drivers who drink and drivers who do not drink, between drivers who are involved in alcohol-related traffic accidents and those who are not, and between drivers who are apprehended by the police for drinking driving and those who are not (for these three comparisons involving the British Columbia driving population, see Mercer 1982, 1983, 1984). Further, among drinking drivers, one could probably distinguish among the sub-sets of those who are in alcohol-related accidents, those who are apprehended by the police, and those who have been both in accidents and were apprehended, while the dimensions of multiple accidents and multiple offences adds two additional factors to an already complex set of criterion variables.

Having noted both the variety of the sets and sub-sets of drinking drivers and the complexity of attempting to define the characteristics of each group, Simpson's dichotomy of the impaired driver problem vs. the impaired problem driver still stands. From a traffic accident countermeasures point of view, it is important to know if the apprehended drinking driver is different from other drivers. For example, if the apprehended drinking driver is a generally average driver who unintentionally became impaired, drove, and was apprehended, then education focussing on the effects of alcohol and laws restricting access to alcohol would reduce impairment severity and frequency (and thus presumably reduce alcohol related traffic accidents). Further, if the apprehended drinking driver has no more traffic accidents than does the rest of the driving population, then the effectiveness of the DWI laws and police apprehension techniques must be questioned. On the other hand, if the apprehended drinking driver is a generally unsafe driver, having a record of multiple convictions and

traffic accidents, then the problem of these traffic accidents might be better addressed through driver training, education and counselling that includes, but is not limited to, the topic of alcohol and driving. Put simply, is the heart of the problem primarily alcohol consumption or primarily generally dangerous driving habits that happen to include alcohol consumption?

METHOD

In order to examine the "impaired driver problem vs. the impaired problem driver" question, a random sample of 9,273 British Columbia driver records was taken from the British Columbia Ministry of Transportation and Highways driver record data base in December, 1984. The sample was then written into a fixed format flat file read by SPSS-X to allow analyses of the records. This sample represents an accurate picture of the approximately two million record data base with about 1% error in either direction. As the codes for recording offences were changed in June, 1980, all records of offences prior to that date were deleted in order to reduce computer analysis costs.

Analyses:

Driver records were sorted into three groups and then the groups were compared in terms of gender distribution, age distribution, conviction history, driver's licence suspension history, and recorded traffic accident history. The three groups were comprised of: those drivers who had not been convicted of Driving While Impaired between June, 1980 and December, 1984, (N=8,992); those drivers who had been convicted of DWI once only between those dates, (N=235); and those drivers who had been convicted of DWI more than once between those dates (N=46).

RESULTS

As the general demographic characteristics of the British Columbia driving population have been described elsewhere (Ministry of Transportation and Highways, 1985), this paper limits itself to comparisons among the driving records of those B.C. drivers who had not been convicted of Driving While Impaired between June, 1980 and December, 1984, those who were convicted of DWI once only between those dates, and those who were convicted of DWI more than once between those dates. The analyses are based on a random sample of 9,273 B.C. driver records.

Before presenting any results, it should be noted that care must be taken in interpreting findings associated with the group having more than one DWI conviction, as the sample size for this group consisted of only 46 persons. This relatively small sample size can produce somewhat unreliable results and therefore figures derived from same must be interpreted very broadly.

Sex and DWI Convictions:

As can be seen from Table 1, 3.0% of the total sample had been convicted of DWI once or more between June, 1980 and December, 1984. However, of the male drivers, 4.6% had been convicted of DWI one or more times, while for the female drivers the figure was only 0.9%. Table 2 shows that, of those convicted of DWI once only, 86.8% were male, and of those convicted more than once, 93.5% were male.

Age and DWI Convictions:

From Table 3 and Figure 1 it can be seen that the age group with the highest proportion of DWI convictions was the 21-25 year old group (8.1%), followed by the 26-30 year old group (4.3%), and the 46-50 year old group (4.2%), while the groups of drivers under 20 years of age and over 60 years of age showed less than a 2% conviction rate.

TABLE 1
DWI Convictions by Drivers' Sex: Column Percentages
British Columbia, June, 1980 - December, 1984

# DWI Conv.	Sex		
	MALE N=5,353	FEMALE N=3,920	TOTAL SAMPLE
0 DWI Conv.	95.4	99.1	97.0
1 DWI Conv.	3.8	0.8	2.5
2+ DWI Conv.	0.8	0.1	0.5
TOTAL%	100.0%	100.0%	100.0%

TABLE 2
DWI Convictions by Drivers' Sex: Row Percentages
British Columbia, June, 1980 - December, 1984

# DWI Conv.	Sex		
	MALE	FEMALE	TOTAL
0 DWI Conv. N=8,992	56.8	43.2	100.0%
1 DWI Conv. N=235	86.8	13.2	100.0%
2+ DWI Conv. N=46	93.5	6.5	100.0%
TOTAL SAMPLE	57.7	42.3	100.0%

FIGURE 1

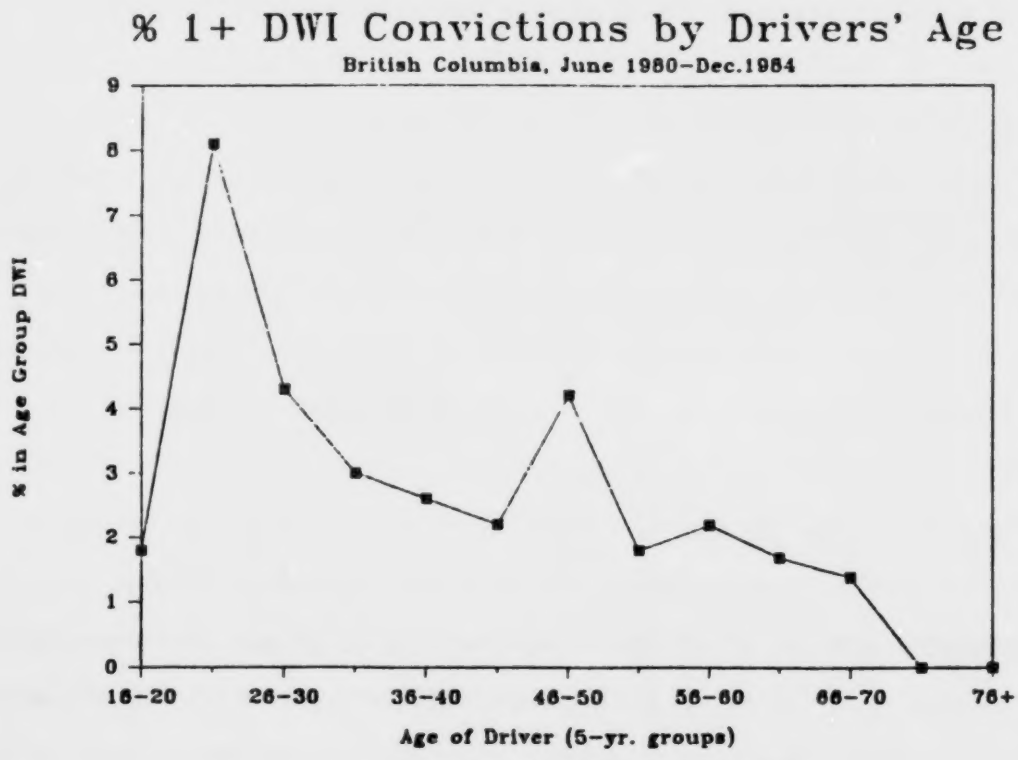

TABLE 3
DWI Convictions by Drivers' Age: Column Percentage
British Columbia, June, 1980 - December, 1984

# DWI Conv.	AGE												
	16-20 N=444	21-25 N=1084	26-30 N=1324	31-35 N=1075	35-40 N=979	41-45 N=698	46-50 N=571	51-55 N=562	56-60 N=535	61-65 N=534	66-70 N=444	71-75 N=417	76+ N=586
0 DWI Conv.	98.2	91.9	95.7	97.0	97.4	97.8	95.8	98.2	97.8	98.3	98.6	100.0	100.0
1 DWI Conv.	1.8	7.1	3.5	2.3	2.3	1.3	4.0	1.2	1.9	1.5	1.4	0.0	0.0
2+ DWI Conv.	0.0	1.0	0.8	0.7	0.3	0.9	0.2	0.6	0.3	0.2	0.0	0.0	0.0
TOTAL %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %

TABLE 4
DWI Convictions by Drivers' Ages: Row Percentages
British Columbia, June, 1980 - December, 1984

# DWI	AGE													
	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76+	TOTAL %
0 DWI Conv. N=8992	4.8	11.1	14.1	11.6	10.6	7.6	6.1	6.1	5.8	5.8	4.9	4.6	6.9	100.0 %
1 DWI Conv. N=235	3.4	32.8	19.6	10.6	9.8	3.8	9.8	3.0	4.3	3.4	2.6	0.9	0.0	100.0 %
2+ DWI Conv. N=46	0.0	23.9	23.9	15.2	6.5	13.0	2.2	6.5	4.3	2.2	0.0	2.2	0.0	100.0 %
TOTAL SAMPLE	4.8	11.7	14.3	11.6	10.6	7.5	6.2	6.1	5.8	5.8	4.8	4.5	6.9	100.0 %

TABLE 5
DWI Convictions by Recorded Convictions (Not DWI)
British Columbia, June, 1980 - December, 1984

# DWI Conv.	Recorded Convictions (Not DWI)						
	0 Conv.	1 Conv.	2 Conv.	3 Conv.	4 Conv.	5+ Conv.	TOTAL %
0 DWI Conv.	60.0	17.5	8.4	5.0	2.9	6.2	100.0
1 DWI Conv.	21.7	20.4	14.5	10.6	6.4	26.4	100.0
2+ DWI Conv.	19.6	15.2	13.0	8.7	13.0	44.1	100.0

Table 4 shows that, of those convicted of DWI only once between June 1980 and December, 1984, about half (52.4%) were between 21-30 years of age, while only 3.4% were 16-20 years of age and 6.9% were over 60 years of age. Similarly, of those convicted of DWI more than once, 47.8% were between 20-30 years of age, while 0.0% were below 20 years of age and 4.4% were over 60 years of age. On the other hand, for those not convicted of DWI, 25.7% were between 21-30, 4.8% were between 16-20, and 17.6% were over 60 years of age.

Conviction History:

Table 5 shows that, of those with no DWI convictions between June, 1980 and December, 1984, 40% had been convicted of one or more other driving offences, while the figure for the one DWI conviction group was 78.3% and the figure for the two or more DWI conviction group was 80.4%. Tables 6, 7, and 8 show that those convicted of DWI receive a higher frequency of convictions for Canadian Criminal Code offences (e.g. Dangerous Driving), British Columbia Motor Vehicle Act convictions (e.g. Failure to Yield Right of Way, Excessive Speed), and B.C. Motor Vehicle Regulations (e.g. Loud and Unnecessary Noise) than do those with no DWI convictions.

Table 9 examines the conviction rates per 100 drivers for specific convictions under the Canadian Criminal Code, the British Columbia Motor Vehicle Act and the B.C. Motor Vehicle Regulations. (It should be noted that those convictions recorded for less than 0.1% of all three groups of drivers have not been included in this table.)

While those convicted of DWI generally showed a higher frequency of other convictions than did those with no DWI convictions, the pattern of offences associated with the DWI groups showed very little difference from

TABLE 6
DWI Convictions by # Criminal Code Convictions
British Columbia June, 1980 - December, 1984

# DWI Conv.	# Criminal Code (CRIM.) Convictions			
	0 CRIM. Conv.	1 CRIM. Conv.	2+ CRIM. Conv.	TOTAL (%)
0 DWI Conv.	99.9	0.1	0.0	100%
1 DWI Conv.	96.2	3.4	0.4	100%
2+ DWI Conv.	86.6	10.9	2.5	100%

TABLE 7
DWI Convictions by Motor Vehicle Act Convictions
British Columbia, June, 1980 - December, 1984

# DWI Conv.	Motor Vehicle Act (MVA) Convictions							
	0 MVA Conv.	1 MVA Conv.	2 MVA Conv.	3 MVA Conv.	4 MVA Conv.	5 MVA Conv.	6+ MVA Conv.	TOTAL %
0 DWI Conv.	60.0	17.6	8.3	5.0	2.9	2.0	4.2	100.0
1 DWI Conv.	22.6	20.4	14.5	10.2	6.8	7.2	18.3	100.0
2+ DWI Conv.	19.6	21.7	6.5	10.9	13.0	6.5	21.8	100.0

TABLE 8
DWI Convictions by # Motor Vehicle Regulation Convictions
British Columbia June, 1980 - December, 1984

# DWI Conv.	# Motor Vehicle Regulation (MVR) Convictions			
	0 MVR Conv.	1 MVR Conv.	2+ MVR Conv.	TOTAL (%)
0 DWI Conv.	99.4	0.5	0.1	100%
1 DWI Conv.	94.5	4.7	0.9	100%
2+ DWI Conv.	95.0	2.8	2.2	100%

TABLE 9
Average # Convictions/100 Drivers, British Columbia, June, 1980 - Dec. 1984: Drivers with 0 DWI Convictions, 1 DWI Conviction, 2+ DWI Convictions

CONVICTION Section of law & conviction description C = Criminal Code; M = Motor Vehicle Act; R = MVA Regulations	AVERAGE # CONV./100 DRIVERS		
	0 DWI CONV. N=8,992	1 DWI CONV. N=235	2+ DWI CONV. N=46
C233 - Criminal Negligence/Failure to remain/Dangerous Driving	0.1	4.3	13.0
C234 - Driving while ability impaired	0.0	45.5	102.2
C235 - Breath sample not provided	0.0	4.7	28.3
C236 - Driving with more than 80 mgs of alcohol in blood	0.0	49.4	89.9
C238 - Driving while under suspension	0.0	0.4	0.0
M130 - Disobeying a traffic control device	1.6	2.6	0.0
M133 - Failing to stop at a traffic control light (yellow light)	2.2	2.1	4.3
M134 - Failing to stop at a traffic control light (red light)	3.8	11.1	15.2
M136 - Failing to stop at a traffic control light (flashing light)	0.1	0.0	0.0
M145 - Failing to obey construction speed zone	0.2	0.0	0.0
M148 - Driving over newly painted sign or marking	0.2	0.8	0.0
M149 - Driving at excess speed for conditions	2.7	19.1	10.9
M150 - Driving too slowly	0.0	0.9	0.0
M151 - Speeding	56.2	140.9	130.4
M152 - Speeding playground/school zone	5.3	10.6	8.7
M153 - Failing to stop on meeting or overtaking a school bus	0.0	0.4	0.0

TABLE 9 (Continued)
Average # Convictions/100 Drivers, British Columbia, June, 1980 - Dec. 1984:
Drivers with 0 DWI Convictions, 1 DWI Conviction, 2+ DWI Convictions

CONVICTION Section of law & conviction description C = Criminal Code; M = Motor Vehicle Act; R = MVA Regulations	AVERAGE # CONV./100 DRIVERS		
	0 DWI CONV. N=8,992	1 DWI CONV. N=235	2+ DWI CONV. N=46
M154 - Failing to drive on right (except when passing)	0.2	3.8	0.0
M155 - Changing lanes illegally	1.0	3.8	2.2
M157 - Passing on a solid double line	0.7	2.1	6.5
M159 - Failing to drive safely when overtaking another vehicle	0.0	0.8	0.0
M160 - Passing on right	0.3	0.4	2.2
M161 - Failing to drive safely passing on left	0.1	0.9	0.0
M162 - Passing without clear view for safe distance	0.1	0.0	0.0
M163 - Disobeying traffic signal or sign	4.8	8.9	6.5
M164 - Following too closely	0.7	1.3	2.2
M165 - Driving against highway division barrier	0.0	0.0	4.3
M166 - Improper entry to Controlled Access Highway	0.0	0.4	0.0
M167 - Improper turn at intersection	0.6	2.1	8.7
M168 - Illegal left turn	0.2	0.0	0.0
M170 - Making an illegal reverse turn	0.6	1.7	0.0
M172 - Failing to signal a turn	0.0	0.0	2.2

TABLE 9 (Continued)
Average # Convictions/100 Drivers, British Columbia, June, 1980 - Dec. 1984:
Drivers with 0 DWI Convictions, 1 DWI Conviction, 2+ DWI Convictions

CONVICTION Section of law & conviction description C = Criminal Code; M = Motor Vehicle Act; R = MVA Regulations	AVERAGE # CONV./100 DRIVERS		
	0 DWI CONV. N=8,992	1 DWI CONV. N=235	2+ DWI CONV. N=46
M175 - Failing to yield right of way at intersection	0.2	0.4	0.0
M176 - Failing to yield right of way on left turn	0.4	0.4	0.0
M177 - Failing to yield right of way on entering through highway	0.4	0.8	0.0
M178 - Emerging from alley without due care	0.1	0.0	0.0
M179 - Failing to stop when an emergency vehicle approaches	0.0	0.8	2.2
M181 - Failing to yield right of way to pedestrian	0.6	0.8	0.0
M186 - Failing to stop at railway crossing	0.1	0.0	0.0
M187 - Failing to stop properly at stop sign	4.3	11.5	10.9
M194 - Failing to exercise due caution backing up	0.6	1.7	4.3
M201 - Driving on sidewalk	0.1	0.4	0.0
R 7 - Loud and unnecessary noise from motor vehicle	0.6	6.4	6.6
AVERAGE NUMBER OF CHARGES/DRIVER	1.1	3.9	6.5

TABLE 10
Conviction Ranking and Rates, British Columbia, June, 1980 - Dec. 1984:
Drivers with 0 DWI Convictions, 1 DWI Conviction, 2+ DWI Convictions

RANK	CONVICTIONS/100 DRIVERS		
	0 DWI Convictions	1 DWI Conviction	2+ DWI Convictions
1	M151 Speeding (56.2)	M151 Speeding (140.9)	M151 Speeding (130.4)
2	M152 Speeding in school zone (5.3)	M149 Excess speed/ conditions (19.1)	M134 Fail to stop at red light (15.2)
3	M130 Disobeying a signal (4.8)	M163 Failing to stop at sign (11.5)	C233 Criminal Negligence (13.0)
4	M163 Failing to stop at sign (4.3)	M134 Fail to stop at red light (11.1)	M163 Failing to stop at sign (10.9)
5	M134 Fail to stop at red light (3.8)	M152 Speeding in school zone (10.6)	M149 Excess speed/ conditions (10.9)
6	M149 Excess speed/ conditions (2.7)	M130 Disobeying a signal (8.9)	M167 Improper turn @ intersection (8.7)
7	M133 Fail to stop @ yellow light (2.2)	R7 Loud/Unnecessary noise from vehicle (6.4)	M152 Speeding in school zone (8.7)
8	M130 Disobeying a signal (1.6)	C233 Criminal Negligence (4.3)	R7 Loud/unnecessary noise from a vehicle (6.6)
9	M155 Illegal lane change (1.0)	M155 Illegal lane change (3.8)	M130 Disobeying a signal (6.5)
10	M157 Passing on a dbl solid line (0.7)	M154 Failure to drive on right (3.8)	M157 Passing on a dbl solid line (6.5)

the pattern of offences for the no DWI group, as can be seen from Table 10. That is, as a group, those not convicted of DWI seemed to commit roughly the same driving offences as did those convicted of DWI, however, those convicted of DWI committed the offences more frequently.

Suspension History:

Table 11 illustrates the relationship between DWI convictions and driving licence suspensions excluding those suspensions associated with DWI convictions. From this it can be seen that, of those with no DWI convictions between June, 1980 and December, 1984, 1.4% had one or more suspensions, while the figures for the one only DWI conviction group and the two or more DWI conviction group were 19.6% and 32.6% respectively.

Traffic Accident History:

From Table 12 it can be seen that, of those with no DWI convictions between June, 1980 and December, 1984, 20.9% have had one or more traffic accidents recorded through Traffic Accident Report Forms (MV104), completed either by the motorist for less serious accidents, or by the police for more serious accidents. For those with one only DWI conviction between those dates, 50.6% had one or more traffic accidents recorded, and for those with two or more DWI convictions, the figure was 60.9%. However, two points need to be noted concerning these figures: First, as noted previously, the small sample size of the two or more DWI group makes the numbers associated with that group somewhat unstable, and second, that an unknown bvut probably not insubstantial number of traffic accidents are not reported by drivers in order to avoid prosecution and insurance penalties. As single vehicle accidents would be the easiest sort not to report because of the lack of witnesses, and as drinking driving accidents tend to be

TABLE 11
DWI Convictions by # Recorded Suspensions (Excluding DWI Related)
British Columbia June, 1980 - December, 1984

# DWI Conv.	# Recorded Suspensions (Susp.)				
	0 Susp.	1 Susp.	2 Susp.	3+ Susp.	TOTAL %
0 DWI Conv.	98.6	1.0	0.2	0.2	100%
1 DWI Conv.	80.4	15.7	2.1	1.7	100%
2+ DWI Conv.	67.4	26.1	4.3	2.2	100%

TABLE 12
DWI Convictions by # Recorded Traffic Accidents: Row Percentages
British Columbia June 1980 - December, 1984

# DWI Conv.	# Recorded Traffic Accidents (Accd.)				
	0 Accd.	1 Accd.	2 Accd.	3+ Accd.	TOTAL (%)
0 DWI Conv.	79.1	16.0	3.6	1.3	100%
1 DWI Conv.	49.4	28.9	14.5	7.2	100%
2+ DWI Conv.	39.1	41.3	17.4	2.2	100%

TABLE 13
DWI Convictions by # Recorded Traffic Accidents: Column Percentages
British Columbia June, 1980 - December, 1984

# DWI Conv.	# Recorded Traffic Accidents (Accd.)			
	0 Accd.	1 Accd.	2 Accd.	3+ Accd.
0 DWI Conv.	98.2	94.3	88.5	87.3
1 DWI Conv.	1.6	4.5	9.3	12.6
2+ DWI Conv.	0.2	1.2	2.2	0.1
TOTAL %	100.0 %	100.0 %	100.0 %	100.0 %

single vehicle accidents (Mercer, 1984, p.46) one might suspect that the drinking driving accident rate is somewhat underreported.

Table 13 shows that, as the number of recorded accidents per driver increases, the number of DWI convictions also increases.

DISCUSSION

It is clear from the analyses of a random sample of 9,273 British Columbia drivers' records that the group of drivers who had been convicted of Driving While Impaired between June, 1980 and December, 1984 differed substantially from those who had not be convicted of DWI during that time period. Convicted drinking drivers were more likely to be male: 4.6% of the male drivers had been convicted of DWI while the figure for the female drivers was only 0.9%. About half the convicted drinking drivers were between 20 and 30 years of age, while only about a quarter of those not convicted of DWI were in that age group.

Regarding conviction history, 60% of those not convicted of DWI had no other driving convictions, while for those convicted of DWI only about 20% had no other driving convictions. That is, those with DWI convictions had about twice the liklihood of having other driving-related convictions. Further, this higher liklihood of having been convicted was particularly evident with regard to Canadian Criminal Code convictions (e.g. dangerous driving, leaving the scene of the accident, criminal negligence) and with regard to B.C. Motor Vehicle Regulation convictions (e.g. loud and unnecessary noise from vehicle), although the absolute frequency of Motor Vehicle Act convictions was substantially larger than the number of Criminal Code or Motor Vehicle Regulation convictions for both those convicted and not convicted of DWI.

On the other hand, while the DWI convicted group showed a much higher rate of other driving-related convictions than the group not convicted of DWI, the pattern of convictions - with the exception of Criminal Code and Motor Vehicle Regulation convictions - showed no discernable differences. To illustrate, speeding was the single most frequently cited conviction for both those convicted and not convicted of DWI, while running a red light and ignoring a stop sign were within the five most frequently recorded convictions for all groups of drivers.

Similar to conviction frequencies, those convicted of DWI had a relatively high rate of drivers' licence suspensions and recorded traffic accidents when compared to those not convicted of DWI. In fact, those convicted of DWI had over twice the rate of traffic accidents: about 80% of those not convicted of DWI had no recorded accidents while about 40-50% of those convicted of DWI had no recorded accidents.

In sum, the results of these analyses suggest that the situation is one of the impaired problem driver as opposed to the impaired driver problem. That is, when compared to drivers who have not been convicted of Driving While Impaired, those convicted of DWI have had about twice as many other driving-related convictions and over twice the number of reported traffic accidents. On the whole, convicted drinking drivers appear to be relatively dangerous drivers who also consume alcohol. From this it follows that drinking driving countermeasures might be best associated with a broad spectrum of driver training and education that includes, but is not limited to, information on alcohol.

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Five Driver Licence Categories: Drivers' Age, Traffic Convictions and Traffic Accidents.
British Columbia, June 1980 - December 1984

SUMMARY

Professional drivers (i.e. Licence Classes 1-4) showed a substantially higher traffic conviction rate and traffic accident rate than did non-professionals (i.e. Licence Class 5). However, if one were to assume that professional drivers had four times the driving exposure of non-professionals, then in all liklihood they are substantially better drivers per driven mile than are non-professionals.

TABLE 1
Drivers' Licence Class by Recorded Convictions: Row Percentages
British Columbia, June, 1980 - December, 1984

Drivers' Licence Class	Recorded Convictions						
	0 Conv.	1 Conv.	2 Conv.	3 Conv.	4 Conv.	5+ Conv.	TOTAL%
Class 1	29	22	13	14	6	16	100%
Class 2	45	17	8	9	9	12	100%
Class 3	45	22	10	4	2	17	100%
Class 4	31	21	15	10	6	17	100%
Class 5	60	17	9	5	3	5	100%

TABLE 4
Drivers' Licence Class by Recorded Traffic Accidents: Row Percentages
British Columbia June 1980 - December, 1984

Drivers' Licence Class	# Recorded Traffic Accidents (Accd.)				
	0 Accd.	1 Accd.	2 Accd.	3+ Accd.	TOTAL (%)
Class 1	59	21	12	8	100%
Class 2	52	23	15	10	100%
Class 3	65	22	9	4	100%
Class 4	61	27	8	4	100%
Class 5	76	18	5	1	100%

FIVE DRIVER LICENCE CATEGORIES: DRIVERS' AGE, TRAFFIC CONVICTIONS AND TRAFFIC ACCIDENTS BRITISH COLUMBIA, JUNE 1980- DECEMBER 1984

From time to time there is a serious traffic accident involving a bus, truck, or taxi and as a consequence the competence of professional drivers is called into question, which in turn can bring into question the licencing and regulation of commercial drivers. Indeed, commercial drivers have been portrayed on a continuum ranging from courteous, careful "knights of the road" to alcohol and amphetamine-using speed-demons whose only concern is to meet a deadline.

However, it is difficult to come to grips with the question of the competence of professional drivers, as their vehicles, driving time of day, distance travelled and overall exposure to traffic, weather and so on differs both among themselves (e.g. urban bus driver v.s. long-haul tractor-trailer driver) and between themselves and the average passenger car driver. Nonetheless, it is the purpose of this paper to begin to examine the professional driver in British Columbia, Canada, through an analysis of the driving-related conviction records and traffic accident records of both commercial and non-commercial drivers registered in this province. Further, the role of drivers' age will also be examined in terms of drivers' licence classifications and both convictions and accidents.

METHOD

In order to examine the relationship between driver's licence class and both driving-related conviction record and traffic accident record, a random sample of 9,273 British Columbia driver records was taken from the British Columbia Ministry of Transportation and Highways driver record data base in December, 1984. The sample was then written into a fixed format flat file read by SPSS-X to allow analyses of the records. This sample represents an accurate picture of the approximately two million record data base with about 1% error in either direction. As the codes for recording offences were changed in June, 1980, all records of offences and traffic accidents prior to that date were deleted in order to reduce computer analysis costs.

Analyses

Driver records were sorted into five licence category groups and then the groups were compared in terms of age distribution, conviction history, and recorded traffic accident history. The five groups consisted of: those with a Class 1 licence (N=181), which allows them to drive large tractor-trailer rigs as well as vehicles covered by Classes 2 through 5; those with a Class 2 licence (N=62), which allows them to drive large buses as well as vehicles covered by Classes 3 through 5; those with a Class 3 licence

(N=206), which allows them to drive large pick-up and delivery trucks, gravel trucks, and vehicles covered by Classes 4 and 5; those with a Class 4 licence (N=194), which allows them to drive taxis, ambulances, small buses (under 24 passengers) and vehicles covered by Class 5; those with a Class 5 licence (N=8,621), which allows them to drive passenger cars, small trucks (up to 11,000 kg.) and light trailers (up to 4,000 kg.). As there were only 6 people in the sample with a Class 6 licence (motorcycles only), this group was omitted from the analyses.

RESULTS AND DISCUSSION

Before presenting any results, it should be noted that care must be taken in interpreting findings associated with licence Class 2, as the sample size for this group consisted of only 65 persons. This relatively small sample size can produce somewhat unreliable results and therefore figures derived from same must be interpreted very broadly.

Licence Class and Conviction History

Table 1 shows, for each licence category, the percentage of drivers with 0 convictions between June, 1980 and December, 1984, 1 conviction, 2 convictions, 3 convictions 4 convictions, and 5 or more convictions. From this table it can be seen that 71% of those with a Class 1 licence had one or more convictions within that time period, while the figures for Classes 2, 3, 4, and 5 are 55%, 55%, 69%, and 40% respectively.

Table 2 displays licence classes by specific convictions per 100 drivers in the class, while Table 3 shows the 13 most frequent conviction types for each licence class. Finally, Figure 1 graphs the average number of convictions within each licence class by drivers' age in 5-year groupings and Figure 2 shows the same information except that Classes 1 through 4 are combined in order to produce a comparison between professional drivers and non-

TABLE 1
Drivers' Licence Class by Recorded Convictions: Row Percentages
British Columbia, June, 1980 - December, 1984

Drivers' Licence Class	Recorded Convictions						
	0 Conv.	1 Conv.	2 Conv.	3 Conv.	4 Conv.	5+ Conv.	TOTAL%
Class 1	29	22	13	14	6	16	100%
Class 2	45	17	8	9	9	12	100%
Class 3	45	22	10	4	2	17	100%
Class 4	31	21	15	10	6	17	100%
Class 5	60	17	9	5	3	5	100%

TABLE 4
Drivers' Licence Class by Recorded Traffic Accidents: Row Percentages
British Columbia June 1980 - December, 1984

Drivers' Licence Class	# Recorded Traffic Accidents (Accd.)				
	0 Accd.	1 Accd.	2 Accd.	3+ Accd.	TOTAL (%)
Class 1	59	21	12	8	100%
Class 2	52	23	15	10	100%
Class 3	65	22	9	4	100%
Class 4	61	27	8	4	100%
Class 5	76	18	5	1	100%

TABLE 2
Average # Convictions/100 Drivers, British Columbia, June 1980 - Dec. 1984:
Driver's Licence Classes 1 to 5

CONVICTION Section of law & conviction description C = Criminal Code; M = Motor Vehicle Act; R = MVA Regulations	AVERAGE # CONV./100 DRIVERS				
	DRIVER CLASS 1 N=181	DRIVER CLASS 2 N= 62	DRIVER CLASS 3 N=206	DRIVER CLASS 4 N=194	DRIVER CLASS 5 N=8621
C233 - Criminal Negligence/Failure to Remain/Dangerous Driving	0.6	0.0	0.5	0.0	0.3
C234 - Driving while ability impaired	2.2	1.6	1.5	2.6	1.6
C235 - Breath sample not provided	1.1	0.0	0.0	0.0	0.3
C236 - Driving with more than 80 mgs. of alcohol in blood	3.3	3.2	1.0	1.0	1.7
C238 - Driving while under suspension	0.0	0.0	0.0	0.0	0.1
M 23 - Driving without insurance	5.5	3.2	3.9	4.6	2.3
M 24 - Failing to obey restriction on driver's licence	0.0	0.0	0.0	0.0	0.5
M 30 - Failure to produce valid licence	8.8	4.8	8.3	12.4	5.2
M 62 - Failure to remain at scene of accident	0.6	0.0	0.5	1.0	0.3
M 64 - Using another's licence	0.0	0.0	0.0	0.0	0.2
M 88 - Suspension by Superintendent for reasonable cause	0.6	0.0	0.0	0.0	0.1
M 94 - Suspension outside of B.C.	0.6	0.0	0.0	0.0	0.0
M119 - Disobeying a Peace Officer	1.1	0.0	0.0	0.0	0.0
M130 - Disobeying a traffic control device	6.1	1.6	3.9	3.1	1.5
M132 - Failing to yield right of way at control signal	0.0	0.0	0.0	1.0	0.1
M133 - Failing to stop at a traffic control light (yellow light)	2.8	3.2	3.9	3.1	2.1

TABLE 2 (continued)
Average # Convictions/100 Drivers, British Columbia, June 1980 - Dec. 1984:
Driver's Licence Classes 1 to 5

CONVICTION Section of law & conviction description C = Criminal Code; M = Motor Vehicle Act; R = MVA Regulations	AVERAGE # CONV./100 DRIVERS				
	DRIVER CLASS 1 N=181	DRIVER CLASS 2 N= 62	DRIVER CLASS 3 N=206	DRIVER CLASS 4 N=194	DRIVER CLASS 5 N=8621
M134 - Failing to stop at a traffic control light (red light)	8.3	8.1	4.8	8.2	3.8
M136 - Failing to stop at a traffic control light (flashing light)	0.6	0.0	0.0	0.0	0.1
M145 - Failing to obey construction speed zone	0.0	1.6	0.0	0.0	0.2
M148 - Driving over newly painted sign or marking	0.6	1.6	0.0	0.0	0.0
M149 - Driving at excess speed for conditions	9.4	4.8	3.9	4.6	3.0
M150 - Driving too slowly	0.0	0.0	0.0	0.5	0.0
M151 - Speeding	112.7	96.8	107.2	117.5	54.8
M152 - Speeding playground/school zone	9.4	14.5	6.3	0.9	5.2
M153 - Failing to stop on meeting or overtaking a school bus	0.0	0.0	0.0	0.0	0.1
M154 - Failing to drive on right (except when passing)	0.6	3.2	0.0	0.5	0.3
M155 - Changing lanes illegally	0.6	0.0	0.0	3.6	1.0
M156 - Passing when meeting oncoming vehicle	0.0	0.0	0.5	0.0	0.1
M157 - Passing on solid double line	1.7	0.0	1.9	3.1	0.7
M159 - Failing to drive safely when overtaking another vehicle	0.0	0.0	0.0	0.0	0.5
M160 - Passing on right	0.0	0.0	0.0	1.5	0.3

TABLE 2 (continued)
Average # Convictions/100 Drivers, British Columbia, June 1980 - Dec. 1984:
Driver's Licence Classes 1 to 5

CONVICTION Section of law & conviction description C = Criminal Code; M = Motor Vehicle Act; R = MVA Regulations	AVERAGE # CONV./100 DRIVERS				
	DRIVER CLASS 1 N=181	DRIVER CLASS 2 N= 62	DRIVER CLASS 3 N=206	DRIVER CLASS 4 N=194	DRIVER CLASS 5 N=8621
M161 - Failing to drive safely passing on left	0.0	0.0	0.5	0.0	0.1
M162 - Passing without clear view for safe distance	0.0	0.0	0.5	0.0	0.1
M163 - Disobeying traffic signal or sign	6.1	4.8	5.8	17.0	4.6
M164 - Following too closely	3.9	0.0	0.5	0.5	0.7
M165 - Driving against highway division or barrier	0.0	0.0	0.0	0.5	0.0
M167 - Improper turn at intersection	1.1	0.0	1.0	1.0	0.6
M168 - Illegal left turn	0.6	3.2	0.5	1.0	0.1
M170 - Making an illegal reverse turn	0.6	0.0	1.0	1.5	0.6
M171 - Moving a stopped vehicle illegally	0.0	0.0	0.0	0.5	0.1
M172 - Failing to signal a turn	0.0	1.6	0.0	0.5	0.0
M175 - Failing to yield right of way at intersection	0.0	0.0	0.0	0.5	0.2
M176 - Failing to yield right of way on left turn	0.0	0.0	0.5	0.5	0.4
M177 - Failing to yield right of way on entering through highway	1.1	0.0	0.0	1.0	0.4
M178 - Emerging from alley without due care	0.0	0.0	0.0	0.0	0.1
M179 - Failing to stop when an emergency vehicle approaches	0.0	0.0	0.0	0.5	0.0

TABLE 2 (continued)
Average # Convictions/100 Drivers, British Columbia, June 1980 - Dec. 1984:
Driver's Licence Classes 1 to 5

CONVICTION Section of law & conviction description C = Criminal Code; M = Motor Vehicle Act; R = MVA Regulations	AVERAGE # CONV./100 DRIVERS				
	DRIVER CLASS 1 N=181	DRIVER CLASS 2 N= 62	DRIVER CLASS 3 N=206	DRIVER CLASS 4 N=194	DRIVER CLASS 5 N=8621
M181 - Failing to yield right of way to pedestrian	1.1	1.6	0.0	1.5	0.5
M186 - Failing to stop at railway crossing	0.0	0.0	0.0	0.5	0.1
M187 - Failing to stop properly at stop sign	5.5	8.1	3.4	9.8	4.4
M194 - Failing to excerise due caution backing up	1.1	3.2	1.5	0.5	0.6
M201 - Driving on sidewalk	0.0	0.0	0.0	0.0	0.1
M205 - Depositing articles on highway	0.6	0.0	0.0	0.0	0.1
M214 - 24 Hr. Roadside Suspension	5.0	3.2	2.4	2.6	2.7
M216 - Equipment on vehicle	0.6	0.0	1.0	0.0	0.1
M217 - Failing to wear seatbelt	17.1	4.8	12.1	17.5	7.6
M218 - Failure to wear proper head protection	0.0	0.0	0.0	0.6	0.1
R7 - Loud and unnecessary noise from motor vehicle	1.1	0.0	1.5	1.5	0.1
AVERAGE NUMBER OF CHARGES/DRIVER	2.2	1.8	1.8	2.4	1.1

TABLE 3
Conviction Ranking and Rates, British Columbia, June, 1980 - Dec. 1984:
Driver Licence Classes 1 through 5

	DRIVER LICENCE CLASSES				
RANK	DRIVER CLASS 1	DRIVER CLASS 2	DRIVER CLASS 3	DRIVER CLASS 4	DRIVER CLASS 5
1	M151 Speeding (112.7)	M151 Speeding (96.8)	M151 Speeding (107.2)	M151 Speeding (54.8)	M151 Speeding (54.8)
2	M217 Fail to wear seatbelt (17.1)	M152 Speeding in school zone (14.5)	M217 Fail to wear seatbelt (12.1)	M217 Fail to wear seatbelt (17.5)	M217 Fail to wear seatbelt (7.6)
3	M149 Excess speed /conditions (9.4)	M134 Fail to stop at red light (8.1)	M 30 Fail to show valid lic. (8.3)	M163 Fail to stop at stop sign (17.0)	M152 Speeding in school zone (5.2)
4	M152 Speeding in school zone (9.4)	M187 Fail to stop properly (8.1)	M163 Fail to stop at stop sign (5.8)	M 30 Fail to show valid lic. (12.4)	M 30 Fail to show valid lic. (5.2)
5	M 30 Fail to show valid lic. (8.8)	M149 Excess speed/ conditions (4.8)	M134 Fail to stop at red light (4.8)	M187 Fail to stop properly (9.8)	M163 Fail to stop at stop sign (4.6)
6	M134 Fail to stop at red light (8.3)	M 30 Fail to show valid lic. (4.8)	M152 Speeding in school zone (6.3)	M134 Fail to stop at red light (8.2)	M187 Fail to stop properly (4.4)
7	M130 Disobeying a signal (6.1)	M163 Fail to stop at stop sign (4.8)	M149 Excess speed/ conditions (3.9)	M149 Excess speed conditions (4.6)	M134 Fail to stop at red light (3.8)
8	M163 Fail to stop at stop sign (6.1)	M217 Fail to wear seatbelt (4.8)	M130 Disobeying a signal (3.9)	M 23 Driving with out insurance (4.6)	M149 Excess speed /conditions (3.0)
9	M187 Fail to stop properly (5.5)	C236 Driving/more than .08 BAC (3.2)	M133 Fail to stop yellow light (3.9)	M155 Changing lane illegally (3.6)	M214 24 hour suspension (2.7)
10	M 23 Driving with out insurance (5.5)	M 23 Driving with-out insurance (3.2)	M 23 Driving with out insurance (3.9)	M130 Disobeying a signal (3.1)	M23 Driving with-out insurance (2.3)
11	M214 24 hour suspension (5.0)	M133 Fail to stop yellow light (3.2)	M187 Fail to stop properly (3.4)	M133 Fail to stop yellow light (3.1)	M133 Fail to stop yellow light (2.1)
12	M164 Following too closely (3.9)	M154 Fail to drive on right (3.2)	M214 24 hour suspension (2.4)	C234 Driving while impaired (3.1)	C236 Driving/more than .08 BAC (1.7)
13	C236 Driving/more than .08 BAC (3.3)	M168 Illegal left turn (3.2)	M157 Passing/solid double line (1.9)	M157 Passing/solid double line (3.1)	C234 Driving while impaired (1.6)

FIGURE 1

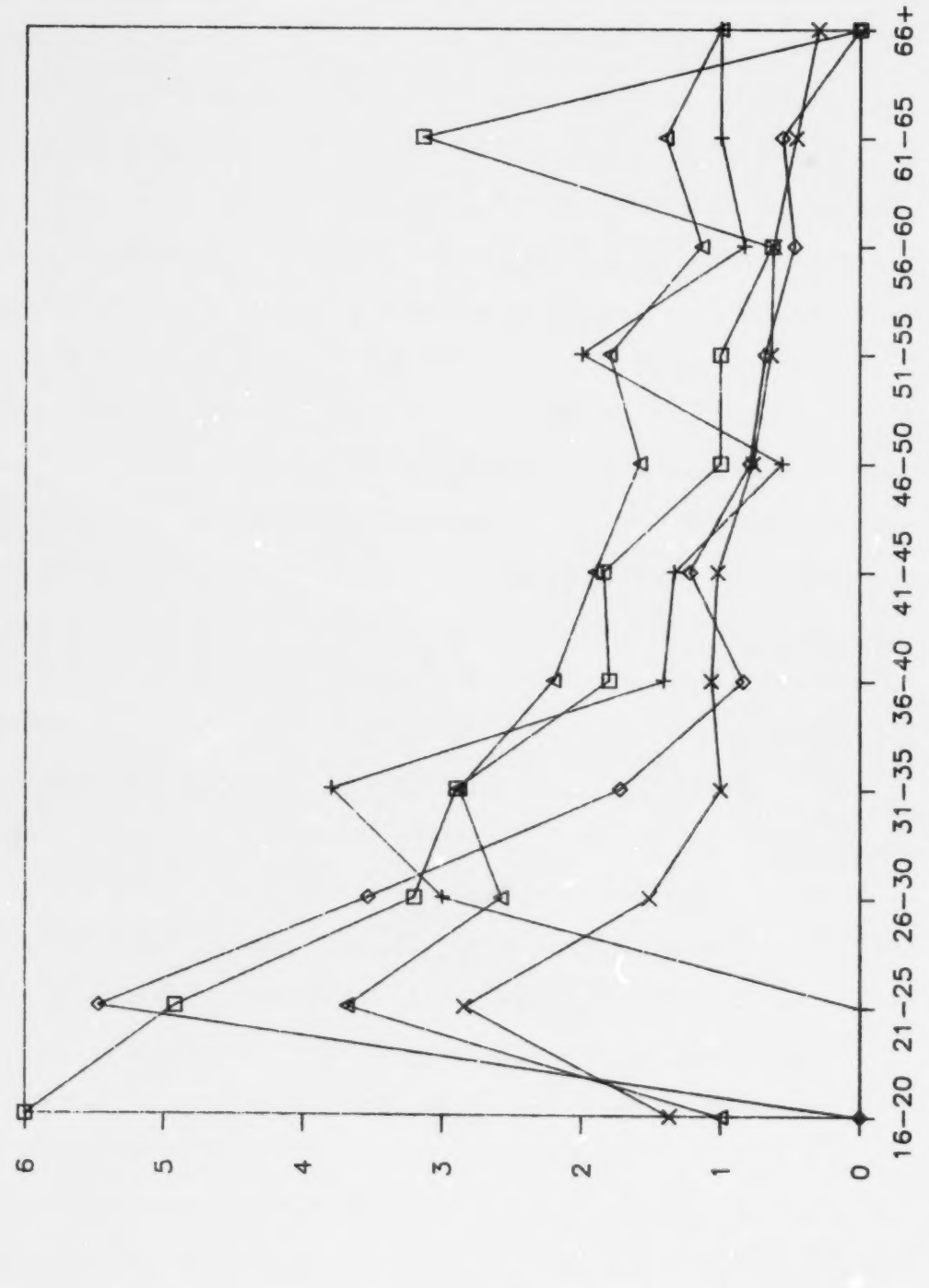
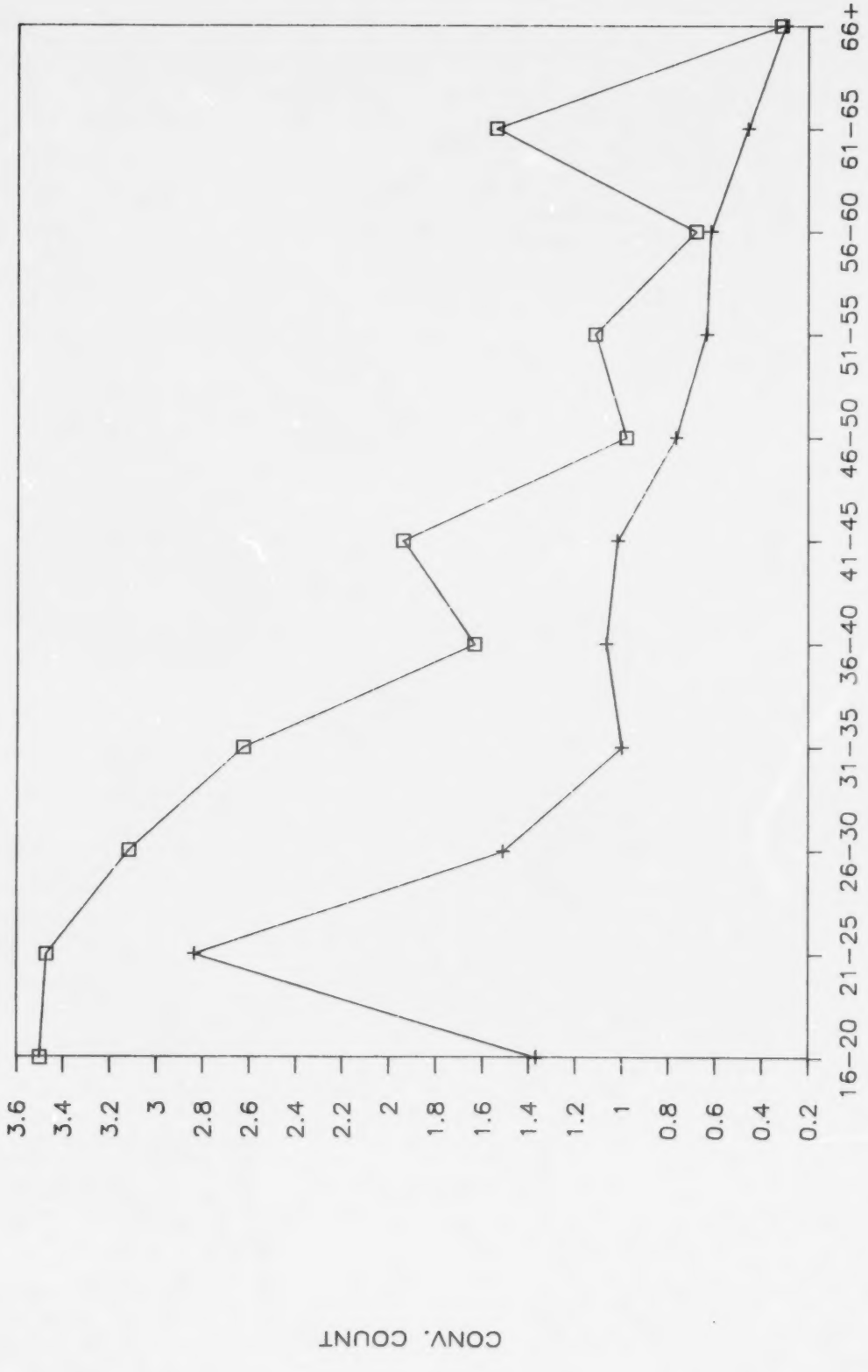

CONV. COUNT
6
5
4
3
2
1
0
16-20 21-25 26-30 31-35 36-40 41-45 46-50 51-55 56-60 61-65 66+
AGE, 5 YR. GROUPINGS
□ cl.1
+ cl.2
◇ cl.3
Δ cl.4
× cl.5

FIGURE 2


CONV. COUNT
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
16-20
21-25
26-30
31-35
36-40
41-45
46-50
51-55
56-60
61-65
66+
AGE, 5 YR. GROUPINGS
□ cl.1-4
+ cl.5

professionals.

From these data it is clear that professional drivers (i.e. Licence Classes 1-4) had a traffic-related conviction rate from 38% to 75% higher than non-professional drivers (i.e. Licence Class 5). Of the professional drivers, Class 1 drivers had the highest conviction rate, followed by Class 4, while Classes 2 and 3 tied for the lowest conviction rate among professional drivers.

In addition, the pattern of conviction differed among the licence classes. To illustrate, if one were to sum the convictions associated with speeding (Motor Vehicle Act sections 149, 151, 152), with stopping (M.V.A. 133, 134, 163,187) and with Driving While Impaired (Criminal Code section 234, 235, 236), one would find that the average Licence Class 1 driver had about 110% more speeding convictions than the average Class 5 driver, 34% more stopping-convictions than the average Class 5 driver, and 83% more D.W.I. convictions. On the other hand the average Class 4 driver had about 5% fewer speeding convictions, 156% more stopping-related convictions, and about the same frequency of D.W.I. convictions as the average Class 5 driver. The average Class 3 driver had the lowest D.W.I. conviction rate, with 31% fewer D.W.I. convictions than the average Class 5 driver, although the average Class 3 driver had 55% more speeding and 20% more stopping-related

convictions than the average Class 5 driver. Finally, the average Class 2 driver has 85% more speeding, 62% more stopping-related and 33% more D.W.I. charges than the average Class 5 driver.

Arguably, these different patterns of convictions are related to the different driving environments of the drivers in each licence category. Class 1 drivers (e.g. tractor-trailer drivers) probably drive in more rural settings, with few stop signs or stop lights, have deadlines to meet, and thus have the highest frequency of speeding charges. Class 2 drivers (e.g. bus drivers) have more urban routes and thus try to stay on schedule both by speeding and by not stopping at lights and stop signs. Class 3 drivers (e.g. pick-up and delivery vehicles drivers) speed, but have a relatively low stopping-related frequency of similar convictions, suggesting a driving environment similar to that of Class 1 drivers. Class 4 drivers (e.g. taxi) generally drive in urban settings where traffic density can limit speeding, but time can be made up by failing to stop at signs and lights. Class 5 drivers (e.g. passenger vehicles) drive in both urban and rural environments but without the deadlines and driving exposure of professional drivers and thus have fewer speeding and stopping-related convictions. Finally, the relatively high D.W.I. conviction rate of Class 1 and Class 2 drivers could be a cause for concern, although the charges

may have been laid when they were off duty.

Considering conviction history by drivers' age, the average rate of conviction for both professional and non-professional drivers generally declined with the drivers' age, although the conviction rate for professional drivers appeared to increase after 60 years of age (see Figure 2).

Licence and Accident History

Table 4 shows, for each licence category, the percentage of drivers with 0 recorded traffic accidents between June, 1980 and December, 1984, 1 accident, 2 accidents, and 3 or more accidents. From this table it can be seen that 41% of those with a Class 1 licence had one or more accidents within that time period, while the figures for Classes 2, 3, 4, and 5 are 48%, 35%, 39%, and 24% respectively.

Figure 3 graphs the average number of accidents within each licence class by drivers' age in 5-year groupings, and Figure 4 shows the same information except that Classes 1 through 4 are combined in order to produce a comparison between professional drivers and non-professionals.

Considering traffic accident frequencies, Class 1 drivers had about 71% more accidents than Class 5 drivers, Class 2 had about 100% more, Class 3 had about 46% more, and Class 4 had about 63% more. On the other hand, professional drivers have perhaps four times the driving exposure of

FIGURE 3

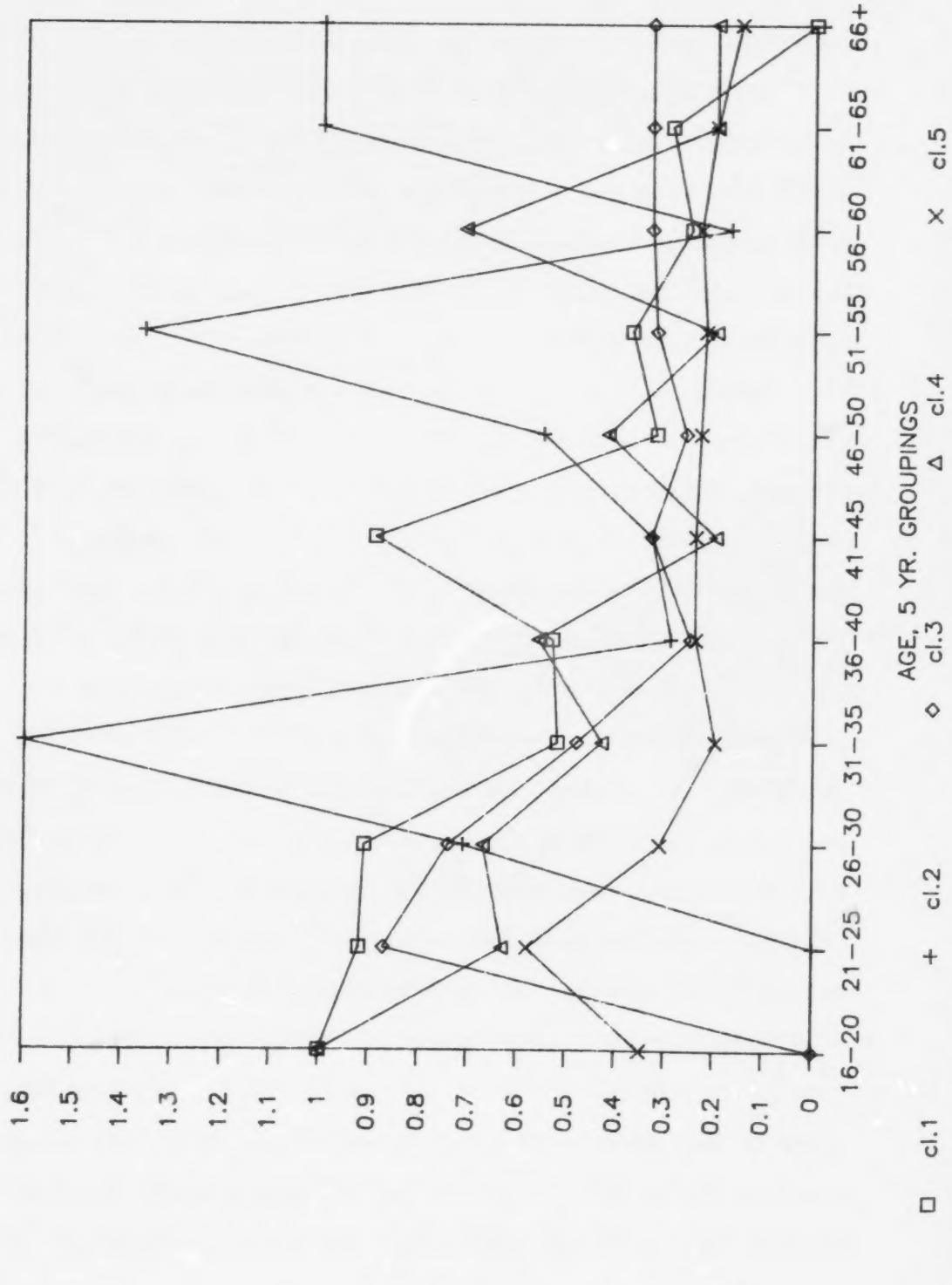
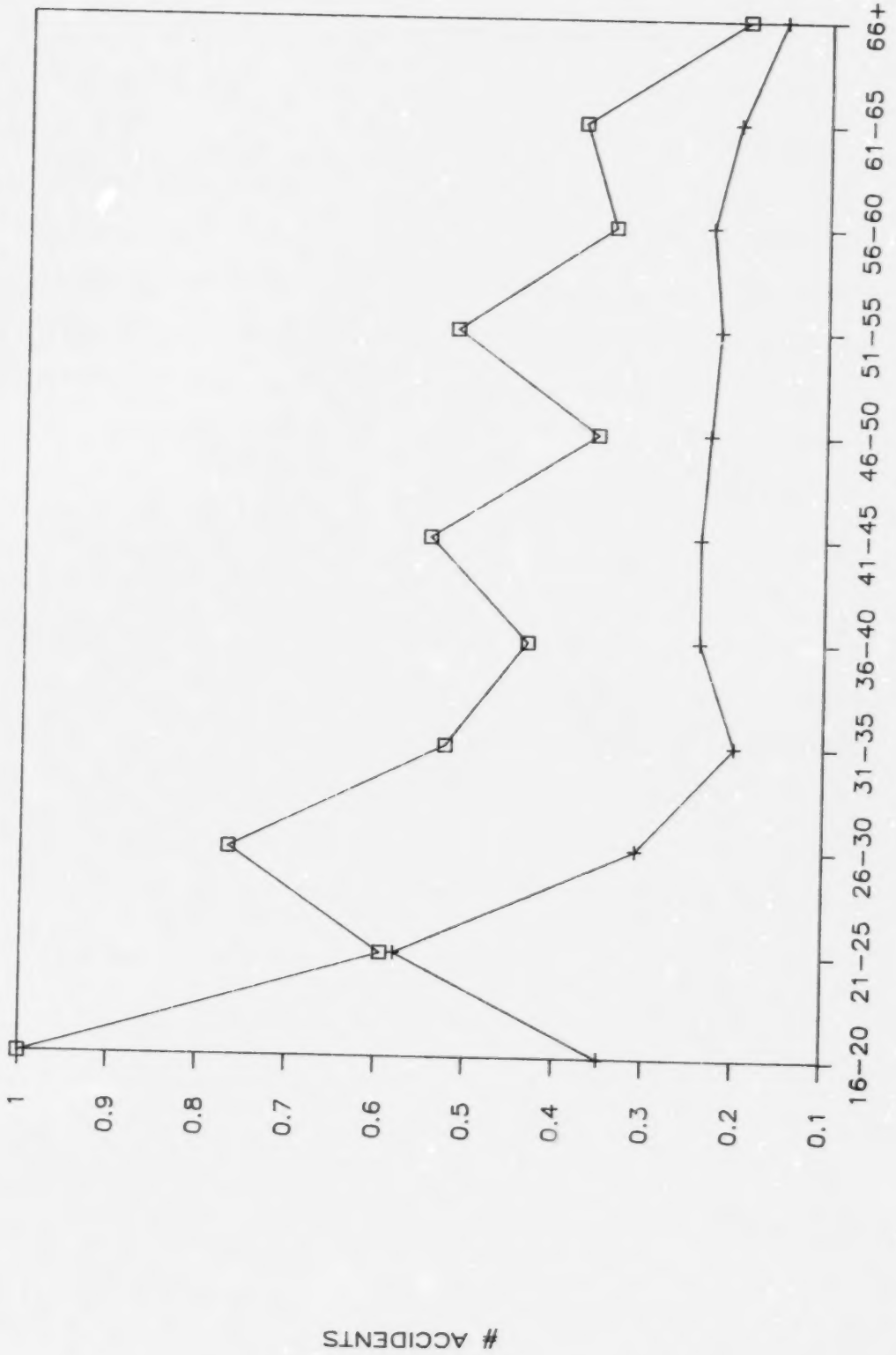

ACCIDENTS
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
16-20 21-25 26-30 31-35 36-40 41-45 46-50 51-55 56-60 61-65 66+
AGE, 5 YR. GROUPINGS
□ cl.1
+ cl.2
◇ cl.3
△ cl.4
× cl.5

FIGURE 4


ACCIDENTS
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
16-20 21-25 26-30 31-35 36-40 41-45 46-50 51-55 56-60 61-65 66+
AGE, 5 YR. GROUPINGS
□ cl.1-4
+ cl.5

non-professionals and therefore have a substantially higher liklihood of being in traffic accidents than does the non-professional driver.

Finally, from Figure 4 it can be seen that for both the professional and non-professional drivers, the liklihood of being in a traffic accident decreases with the driver's age. However, it should also be noted that for the professional drivers only, there appears to be an increase in traffic accidents in the 41-45 and the 51-55 year old driver categories.

Overview

Professional drivers (i.e. Licence Classes 1-4) showed a substantially highter traffic conviction rate and traffic accident rate than did non-professionals (i.e. Licence Class 5). However, if one were to assume that professional drivers had four times the driving exposure of non-professionals, then in all liklihood they are substantially better drivers than are non-professionals.

Age *v.s.* Driving Experience as Predictors of Young Driver's Traffic Accident Involvement

SUMMARY

In sum, the tendency for young drivers to be involved in a disproportionately high number of traffic accidents can not be explained by simply age or by driving experience, and may well be more psychologically determined. Unfortunately, if this is the case, countermeasures that are fair and equitable to all members of an age or experience group would be very difficult to legislate.

Table 1
Driving Experience Group by Driver Age on Percentage Having One or More Traffic Accidents in 1984
Full Sample (N=444)

Driver Age	% One or more Traffic Accidents in 1984			% in Age Group 1 or More 1984 Traffic Accidents
	Low Experience	Medium Experience	High Experience	
16-17 (N=63)	14% (N=58)	0% (N=5)	- (N=0)	13%
18 (N=107)	9% (N=54)	6% (N=51)	0% (N=2)	8%
19 (N=141)	4% (N=28)	16% (N=69)	9% (N=44)	11%
20 (N=133)	17% (N=12)	14% (N=21)	5% (N=100)	8%
% in Experience Group 1 or More 1984 Traffic Accidents	11% (N=152)	12% (N=146)	6% (N=146)	9% (N=444)

AGE V.S. DRIVING EXPERIENCE AS PREDICTORS OF YOUNG DRIVER'S TRAFFIC ACCIDENT INVOLVEMENT

Young drivers are in a disproportionately high number of traffic accidents (Mayhew, 1982). Some of the causes of casualty accidents involving young drivers have been documented. For example, casualty-producing traffic accidents involving drivers who have not yet reached the legal drinking age tend to be judged by investigating police officers as being caused primarily by undue care and attention and by excessive speed, while alcohol involvement becomes as frequently cited a cause as speeding for those reaching the legal drinking age (Mercer, 1985, p.42). In addition, vehicle fault is cited as a causal factor in casualty accidents more frequently for younger drivers than for older drivers (Mercer, 1985).

However, in search of more universally applicable explanations for the high frequency of young driver accidents, there are at lease two positions, each having different consequences in terms of legislative counter-measures. The first argues that, as age is a very powerful predictor of traffic accident involvement, then the problem with young drivers is that they lack the "maturity" that comes with age. Therefore, the best route to reducing young driver accidents is to raise the driving age. A second position argues that it is not age <u>per se</u>, but rather the amount of driving experience that a person has that will predict their traffic accident involvement, and therefore better and longer driver training, graduated licences and so on is the best route to young driver accident reduction.

Unfortunately, there is no easy resolution to this debate, as the majority of drivers aquire their driving licences within a few years of becoming eligible to be tested, and thus it is difficult to separate out

the effects of years of driving experience from age. Nonetheless, it is the purpose of this paper to attempt to weigh the relative contributions of age and driving experience to traffic accident involvement.

METHOD

In British Columbia drivers' licences are distributed to licencing offices and then to new drivers in ascending order. Therefore, the higher the driver's licence number, the more recently the driver was licenced. It follows that drivers' licence numbers can be used as a rough measure of driving experience.

Analysis:

At the beginning of 1985, a random sample of 444 data records of drivers between the ages of 16 and 20 years was drawn from the driver record data base by the Motor Vehicle Department of the Ministry of Transportation and Highways. These driver's licence numbers were then divided into three more-or-less equal groups, corresponding to Low, Medium, and High driving experience groups. Using this variable and driver's age, the frequency of recorded traffic accidents in 1984 was examined using cross tabulations and partial correlations in order to determine the relative effects of age and driving experience on accident frequencies. In addition, these analyses were carried out separately for male and female drivers. (Note: Licence numbers, not experience categories, were used in the correlational analyses. The direction of the correlations have been reversed for this variable for ease of interpretation.)

RESULTS AND DISCUSSION

Tables 1 to 3 show crosstabulations of driving experience group by driver age on the percentage of drivers having 1 or more traffic accidents in 1984 for each of the full sample of drivers, male drivers only, and female drivers only. Tables 4 to 6 show Zero Order (Pearson's r) and Partial Correlations among the number of traffic accidents in 1984, driver's age, and driving experience (measured using licence number sequence and reversed for ease of interpretation) for each of: the full sample of drivers; male drivers only; and female drivers only. The partial correlations between the number of traffic accidents the drivers had in 1984 and the drivers' age are controlled for the effects of driving experience (as measured by licence number sequence), while the partial correlations between driving experience and traffic accidents are controlled for the effects of drivers' age.

Examining Tables 1 to 3 for both genders, the high experience group had the fewest traffic accidents, and there was a peak in the accident frequencies for the 19-year old groups (the age at which alcohol may be legally consumed). On the other hand, as there were proportionally fewer 16-18 year old female drivers than there were 16-18 year old male drivers, one might assume that females choose to acquire their driving licences later than do males. In addition, the females were in fewer accidents (7%) than were the males (11%) in the sample. The results presented in Tables 3 to 6 show that, for drivers between the ages of 16-20 years, neither age nor driving experience predicted traffic accident involvement better than the other. When the effect of driving experience was removed, driver's age

did not predict accident frequency, while when the effect of age was removed, driving experience did not predict accident frequency.

Admittedly, driver's licence sequence is only a very rough measure of driving experience - daily driving diaries and exact mileage and conditions counts would be more accurate. However, if there was a clear and unique relationship between age and accident frequency, or between driving experience and accident frequency, these analyses would probably have shown them. It follows that researchers might well consider driving environment, personality, and attitudinal factors to explain why younger drivers have such a high accident frequency. Perhaps those who choose to acquire driving licences soon after being legally able to do so are qualitatively different from those who choose to wait a few years. One might speculate that they would score more highly on dimensions such as stimulus seeking, rebelliousness, tough-mindedness, extraversion, independence, physical maturity and the like. In turn, these characteristics could well predispose them to risk-taking behaviour and thus to a higher frequency of traffic accidents.

In sum, the tendency for young drivers to be involved in a disproportionately high number of traffic accidents can not be explained by simply age or by driving experience, and may well be more psychologically determined. Unfortunately, if this is the case, countermeasures that are fair and equitable to all members of an age or experience group would be very difficult to legislate.

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20 (N=133)	17% (N=12)	14% (N=21)	5% (N=100)	8%
% in Experience Group 1 or More 1984 Traffic Accidents	11% (N=152)	12% (N=146)	6% (N=146)	9% (N=444)

Table 2
Driving Experience Group by Driver Age on Percentage Having
One or More Traffic Accidents in 1984
Male Drivers Only (N=260)

Driver Age	% One or more Traffic Accidents in 1984			% in Age Group 1 or More 1984 Traffic Accidents
	Low Experience	Medium Experience	High Experience	
16-17 (N=35)	10% (N=30)	0% (N=5)	- (N=0)	9%
18 (N=68)	16% (N=31)	6% (N=35)	0% (N=2)	10%
19 (N=85)	0% (N=13)	20% (N=45)	7% (N=27)	13%
20 (N=72)	20% (N=5)	20% (N=10)	9% (N=57)	11%
% in Experience Group 1 or More 1984 Traffic Accidents	11% (N=79)	22% (N=59)	8% (N=86)	11% (N=260)

Table 3
Driving Experience Group by Driver Age on Percentage Having
One or More Traffic Accidents in 1984
Female Drivers Only (N=184)

Driver Age	% One or more Traffic Accidents in 1984			% in Age Group 1 or More 1984 Traffic Accidents
	Low Experience	Medium Experience	High Experience	
16-17 (N=28)	18% (N=28)	- (N=0)	- (N=0)	18%
18 (N=39)	0% (N=23)	6% (N=16)	- (N=0)	3%
19 (N=56)	7% (N=15)	8% (N=24)	12% (N=17)	9%
20 (N=61)	14% (N=7)	9% (N=11)	0% (N=43)	3%
% in Experience Group 1 or More 1984 Traffic Accidents	10% (N=73)	8% (N=51)	3% (N=60)	7% (N=184)

Table 4
Zero-Order (above diagonal) and Partial Correlations (below diagonal):
Entire Sample (N=444)

Variable	A84	AGE	EXP	Mean	Standard Deviation
# Traffic Accidents in 1984 (A84)		-.03	-.06	0.09	0.29
AGE	.01		.70	18.76	1.05
Experience (EXP)	-.06			4.19M	0.22M

Table 5
Zero-Order (above diagonal) and Partial Correlations (below diagonal):
Male Only Sample (N=260)

Variable	A84	AGE	EXP	Mean	Standard Deviation
# Traffic Accidents in 1984 (A84)		.03	-.01	0.11	0.32
AGE	.05		.69	18.73	1.04
Experience (EXP)	-.05			4.18M	0.22M

Table 6
Zero-Order (above diagonal) and Partial Correlations (below diagonal):
Female Only Sample (N=184)

Variable	A84	AGE	EXP	Mean	Standard Deviation
# Traffic Accidents in 1984 (A84)		-.13	-.15	0.07	0.26
AGE	-.03		.70	18.80	1.07
Experience (EXP)	-.09			4.19M	0.23M

REFERENCES

Mayhew, D.R. Age, Alcohol, and Fatal Crash Risk, Ottawa: Traffic Injury Research Foundation, 1982

Mercer, G.W. The relationship between drivers' age and seven commonly cited factores to casualty traffic accidents. In CounterAttack Traffic Research Papers, Vancouver: Ministry of Attorney General, 1985.

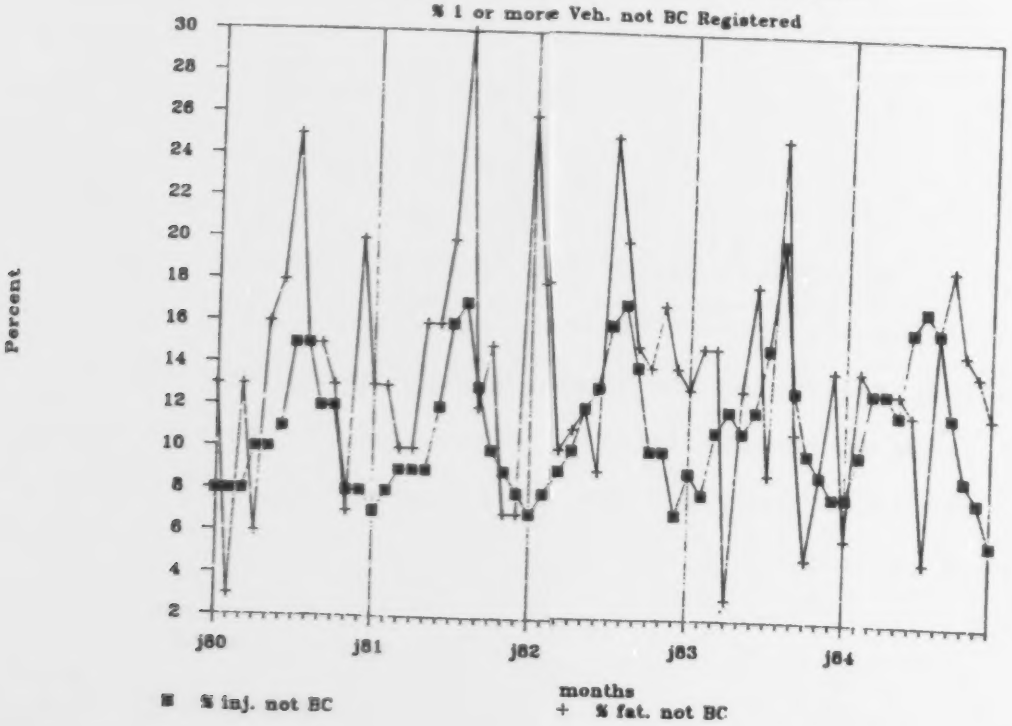
Casualty Accidents Involving Vehicles Registered Out-of-Province, British Columbia, 1984

SUMMARY

In addition to general driving experience, familiarity with the general driving environment and specific route taken are important factors in avoiding traffic accidents. The driving environment of British Columbia can be characterized as being comprised of winding mountain roads with little run-off area and of densely packed urban centers. Arguably, both of these sorts of environments draw out-of-province visitors because of their novelty to the visitor, yet this same novelty makes the driving environment a more dangerous one for the visitor than for the local resident.

The results of this study show that, when compared to B.C. registered vehicles in casualty traffic accidents, out-of-province vehicles are involved in a higher proportion of accidents, accidents occurring on any day of the week, (as opposed to primarily during the week-end), accidents occurring in the Summer months, and accidents not involving alcohol. From this, one gets the picture of a tourist on summer holiday travelling during the day. However, the relatively high proportion of out-of-province drivers in fatal accidents driving commercial vehicles and the relatively high proportion of out-of-province drivers in hit-and-run casualty accidents warrants some concern.

Injury & Fatal Traffic Accidents



Casualty Accidents Involving Vehicles Registered Out-of-Province, British Columbia, 1984

Tourists and commercial carriers from other provinces and from the United States are an important source of revenue for British Columbia. Unfortunately, these visitors are involved in a high proportion of injury and fatal traffic accidents. Therefore is it the purpose of this paper to document some of the characteristics of injury-only and fatal traffic accidents where one or more vehicle was not registered in B.C. These analyses are taken from the Traffic Accident Report Forms completed by the police and compiled by the Motor Vehicle Department of the Ministry of Transportation and Highways. It should be noted that the M.V.D. is constantly updating and improving it's data base, and therefore any figures reported by that Department should supercede those presented in this document.

RESULTS

As can be seen from Tables 1 to 5 and Figure 1, the percentage of both injury and fatal traffic accidents involving one or more vehicles not registered in B.C. tends to increase during the summer months, presumably due to an increase in tourist traffic, often reaching as high as 20% of the injury-only and 25% of the fatal incidents during these periods.

FIGURE 1

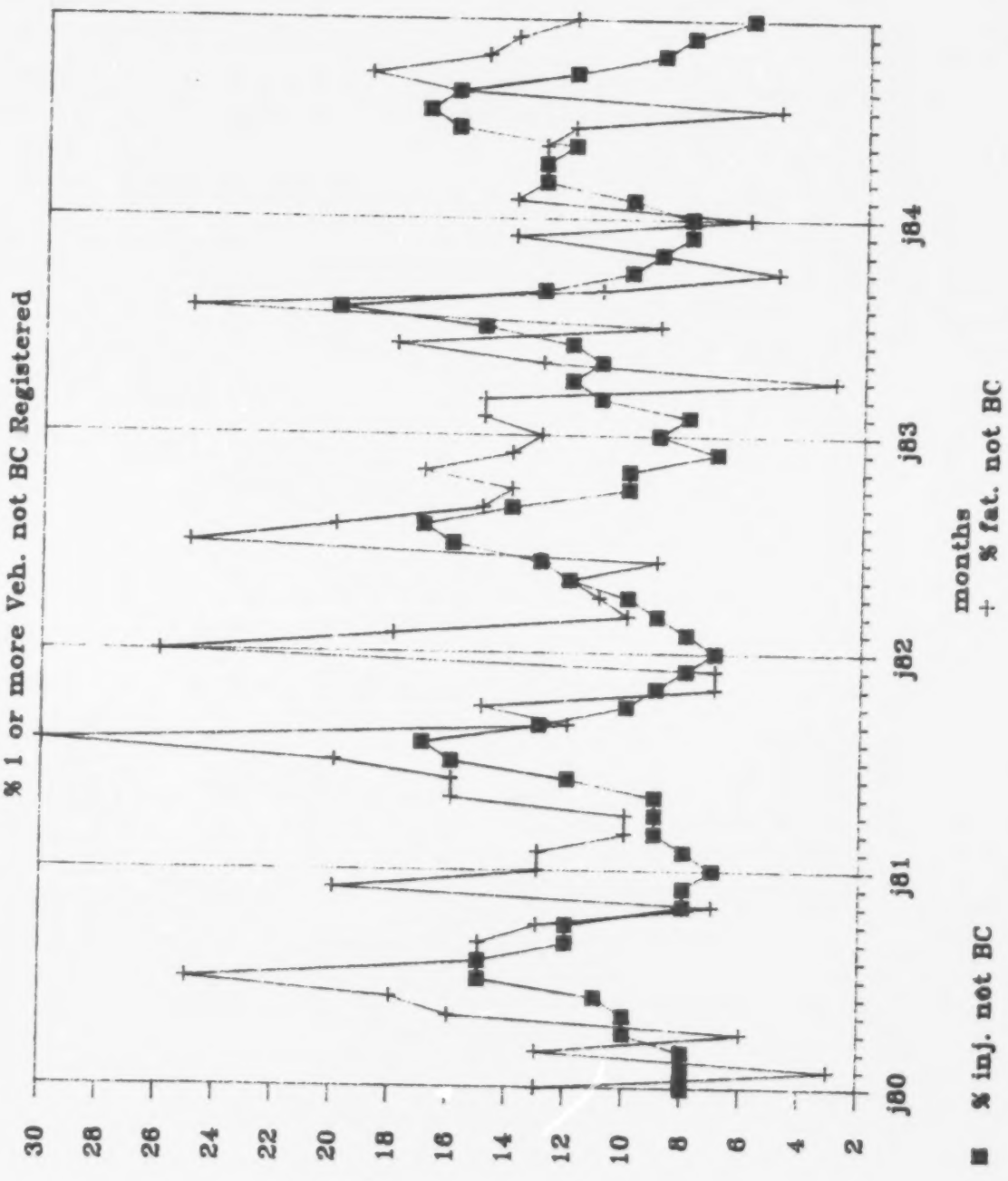

Injury & Fatal Traffic Accidents
% 1 or more Veh. not BC Registered
Percent
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
j80
j81
j82
j83
j84
months
■ % inj. not BC
+ % fat. not BC

TABLE 1
Monthly Proportion of Traffic Accidents Involving 1 or more Out-of-Province Registered Vehicles, British Columbia, 1980

MONTH AND YEAR	INJURY ONLY		FATAL	
	TOTAL NUMBER	% NOT B.C. REG.'	TOTAL NUMBER	% NOT B.C.' REG.'
1980 JANUARY	1765	7.5%	32	12.5%
FEBRUARY	1926	8.0%	32	3.1%
MARCH	1975	7.6%	45	13.3%
APRIL	2084	9.5%	53	5.7%
MAY	2450	10.2%	58	15.5%
JUNE	2575	10.8%	57	17.5%
JULY	2613	14.8%	80	25.0%
AUGUST	2751	14.6%	83	14.5%
SEPTEMBER	2435	12.3%	75	14.7%
OCTOBER	2638	12.1%	62	12.9%
NOVEMBER	2814	8.4%	58	6.9%
DECEMBER	2212	7.7%	50	20.0%
YEAR	28,238	10.5%	685	14.3%

TABLE 2
Monthly Proportion of Traffic Accidents Involving 1 or more Out-of-Province Registered Vehicles, British Columbia, 1981

MONTH AND YEAR	INJURY ONLY		FATAL	
	TOTAL NUMBER	% NOT B.C. REG.	TOTAL NUMBER	% NOT B.C. REG.
1981 JANUARY	2037	7.4%	39	12.8%
FEBRUARY	2157	7.6%	48	12.5%
MARCH	2359	8.8%	62	9.7%
APRIL	2353	8.5%	58	10.3%
MAY	2722	9.4%	83	15.7%
JUNE	2872	11.9%	57	15.8%
JULY	2849	16.2%	64	20.3%
AUGUST	2743	16.8%	100	30.0%
SEPTEMBER	2447	13.2%	75	12.0%
OCTOBER	2606	10.3%	55	14.5%
NOVEMBER	2493	8.9%	54	7.4%
DECEMBER	2634	7.6%	46	6.5%
YEAR	30,273	10.8%	741	15.1%

TABLE 3
Monthly Proportion of Traffic Accidents Involving 1 or more Out-of-Province Registered Vehicles, British Columbia, 1982

MONTH AND YEAR	INJURY ONLY		FATAL	
	TOTAL NUMBER	% NOT B.C.' REG.	TOTAL NUMBER	% NOT B.C.' REG.'
1982 JANUARY	1852	6.8%	27	25.9%
FEBRUARY	1750	8.4%	28	17.9%
MARCH	1720	8.7%	39	10.3%
APRIL	1702	10.1%	45	11.1%
MAY	1925	12.1%	57	12.3%
JUNE	2054	13.0%	46	8.7%
JULY	2135	15.9%	48	25.0%
AUGUST	2015	16.5%	49	20.4%
SEPTEMBER	1908	13.9%	39	15.4%
OCTOBER	2199	10.1%	50	14.0%
NOVEMBER	2150	9.6%	47	17.0%
DECEMBER	1954	7.2%	42	14.3%
YEAR	23,364	11.1%	517	15.7%

TABLE 4
Monthly Proportion of Traffic Accidents Involving 1 or more Out-of-Province Registered Vehicles, British Columbia, 1983

MONTH AND YEAR	INJURY ONLY		FATAL	
	TOTAL NUMBER	% NOT B.C. REG.	TOTAL NUMBER	% NOT B.C. REG.
1983 JANUARY	1600	8.8%	30	13.3%
FEBRUARY	1619	8.3%	34	14.7%
MARCH	1617	10.8%	33	15.2%
APRIL	1704	12.1%	34	2.9%
MAY	1926	11.0%	48	12.5%
JUNE	2031	11.7%	56	17.9%
JULY	2010	14.7%	55	9.1%
AUGUST	1904	20.0%	52	25.0%
SEPTEMBER	1881	12.9%	47	10.6%
OCTOBER	1945	10.1%	44	4.5%
NOVEMBER	2078	9.3	43	9.3%
DECEMBER	1820	7.8%	35	14.3%
YEAR	22,135	11.5%	511	12.7%

TABLE 5
Monthly Proportion of Traffic Accidents Involving 1 or more Out-of-Province Registered Vehicles, British Columbia, 1984

MONTH AND YEAR	INJURY ONLY		FATAL	
	TOTAL NUMBER	% NOT B.C. REG.'	TOTAL NUMBER	% NOT B.C.' REG.'
1984 JANUARY	1461	7.8%	35	5.7%
FEBRUARY	1412	9.9%	21	14.3%
MARCH	1521	12.8%	32	12.5%
APRIL	1568	12.5%	38	13.2%
MAY	1863	11.8%	31	12.9%
JUNE	2059	15.7%	50	12.0%
JULY	2173	16.9%	42	4.8%
AUGUST	2188	15.8%	61	16.4%
SEPTEMBER	2061	12.3%	32	18.8%
OCTOBER	2045	8.7%	34	14.7%
NOVEMBER	2106	8.0%	29	13.8%
DECEMBER	2049	6.4%	33	12.1%
YEAR	22,506	11.7%	438	12.6%

Contributing Factors and Vehicle Types-Fatal and Injury Only

Table 6 compares both injury-only and fatal accidents where one or more vehicles were not registered in B.C. with accidents where all vehicles were B.C. registered in terms of selected factors contributing to the accidents and in terms of the proportion of commercial vehicles in the accidents during 1984.

For fatal accidents involving vehicles registered in B.C., the three most frequently cited contributing factors in 1984 were Alcohol (44.8%), Speeding (30.1%) and Driving Without Due Care (27.5%), while for fatal accidents involving one or more vehicles not B.C. registered, the three most frequently cited contributing factors were Speeding and Driving Without Due Care (both at 28.3%) and Alcohol (20.8%). It is noteworthy that alcohol was cited substantially more often for fatal accidents involving B.C. registered vehicles (i.e. 44.8% v.s. 20.8%).

Considering injury-only accidents - which comprise over 98% of all casualty traffic accidents - those involving only B.C. registered vehicles had Driving Without Due Care (29.4%), and Failure to Yield Right of Way (17.8%) as the two most frequently cited contributing factors, while Alcohol (15.5%) and Speeding (15.5%) were tied for third most cited factor. For injury-only accidents where one or more of the vehicles was not registered in B.C., the three

TABLE 6

Selected Contributing Factors, British Columbia, 1984

ACCIDENTS	TOTAL NUMBER	% OF TOTAL	SELECTED CONTRIBUTING FACTORS						% WEATHER	% COMMERCIAL VEHICLES
			% W/OUT DUE CARE	% ALCOHOL	% SPEEDING	% NOT YIELDING	% TAILGATING	% VEHICLE FAULT		
FATAL										
B.C. Reg. Vehicles	383	87.4%	27.5%	44.8%	30.1%	6.0%	0.0%	3.1%	9.4%	13.9%
Non-B.C. Vehicles	55	12.6%	28.3%	20.8%	28.3%	11.3%	0.0%	7.5%	5.7%	42.6%
INJURY										
B.C. Reg. Vehicles	19,873	88.3%	29.4%	15.5%	15.5%	17.8%	8.1%	4.1%	11.8%	4.5%
Non-B.C. Vehicles	2,633	11.7%	28.0%	9.0%	11.8%	18.4%	5.2%	5.5%	7.6%	7.6%

most frequently cited contributing factors were Driving Without Due Care (28.0%), Failure to Yield Right of Way (18.4%), and Speeding (11.8%). As for the fatal accidents, injury-only accidents showed a higher frequency of Alcohol as a contributing factor for those involving only B.C. drivers (15.5% v.s. 9.0%). Finally, it should be noted that the proportion of fatal to injury-only accidents was about the same for each group: 1.9% of the B.C. vehicles only accidents and 2.0% of the one-or-more not B.C. vehicles accidents were fatal.

Regarding vehicle type and use, in the fatal accidents in 1984 where one or more vehicles were not registered in B.C., 42.6% involved commercial vehicles, while the proportion for B.C. registered only fatal accidents was 13.9%. The respective figures for injury-only accidents were 4.5% (B.C. registered) and 7.6% (one-or-more not-B.C. registered).

Registration Location - Casualty Accidents

Because fatal accidents comprise less than 2% of all casualty accidents, and because it is statistically unsound to try to break relatively small groups into smaller groups for comparisons, the 62 fatal accidents will be added into the 3,061 injury-producing accidents in further analyses of traffic accidents involving one-or-more vehicles not registered in B.C. That is, the remainder of this paper

will deal with casualty accidents in 1984 (i.e. accidents where someone was injured or killed).

Of the out-of-province vehicles in casualty accidents in B.C. in 1984, about 51% were from Alberta, 9% from Ontario, 8% from Washington, 5% from Saskatchewan, 4% from California, and 3% from Manitoba. The remainder (20.3%) were from various other states and provinces, no one of which comprised 4% of the total.

Geographic Location - Casualty Accidents:

Table 7 shows the percent of casualty accidents where one or more vehicles were registered outside of B.C. broken out by police jurisdictions. The Nelson, Vancouver, Victoria, and Kelowna areas are all over the provincial average of about 11.7%, with Nelson Rural (24.2%), Victoria Area Independents (16.1%) and Kelowna Rural (15.6%) as the three highest reporting police jurisdictions. However, it should be noted that the highest number (as opposed to percentage) of casualty accidents involving one or more out-of-province vehicles occur in the Vancouver (i.e. Vancouver Area Independents and R.C.M.P. District 1 Municipal) and Victoria areas.

Time of Day, Day of Week, Month of Year - Casualty Accidents

Table 8 shows that in 1984 there were proportionally fewer casualty accidents involving out-of-province vehicles at night than the proportion of night-time casualty

TABLE 7
Casualty Traffic Accidents, British Columbia, 1984

POLICE JURISDICTION	TOTAL # CASUALTY ACCIDENTS	% ONE OR MORE OUT-OF-PROVINCE
R.C.M.P.		
Kelowna Municipal	893	13.7%
Kelowna Rural	989	15.6% *
Kamloops Municipal	573	10.3%
Kamloops Rural	814	12.8%
Nelson Municipal	166	9.0%
Nelson Rural	805	24.2% *
Prince George Mun.	618	11.7%
Prince George Rural	843	14.5
Prince Rupert Mun.	171	7.0%
Prince Rupert Rural	437	13.3%
District 1 Municipal	6,252	8.6%
District 1 Rural	776	12.5%
Victoria Municipal	620	8.6%
Victoria Rural	792	6.6%
Courtenay Municipal	399	7.5%
Courtenay Rural	739	7.7%
Freeway R.C.M.P.	632	8.1%
INDEPENDENT FORCES		
Vancouver Area	4,910	13.3%
Victoria Area	1,442	16.1% *
Nelson	35	8.6%
PROVINCE	22,912	11.7%

* - Three Highest

accidents involving only B.C. registered vehicles.

Table 9 shows that while casualty traffic accidents involving only B.C. registered vehicles tend to occur most frequently during the Friday-Saturday-Sunday period, those involving one or more out-of-province vehicles are spread more evenly throughout the week.

As was mentioned previously, the highest proportion of out-of-province vehicle accidents in B.C. occur during the summer months (see Figure 1 and Tables 1 to 5)

Location on Road, Area Land Use - Casualty Accidents

Tables 10 and 11 show that the proportions of out-of-province and B.C.-only vehicles in casualty accidents were very similar in terms of location on road and area land use.

Number of Vehicles, Hit-and-Run, Pedestrian Involvement - Casualty Accidents

In 1984 60.8% of the B.C.-only vehicle casualty accidents and 75.4% of the out-of-province vehicle casualty accidents involved more than one vehicle.

In 1984 3.2% of the B.C.-only vehicle casualty accidents and 12.1% of the out-of-province vehicle casualty accidents were hit-and-run.

In 1984 8.6% of the B.C.-only vehicle casualty accidents and 2.3% of the out-of-province vehicle casualty accidents involved pedestrians.

TABLE 8
Time of Day - Casualty Traffic Accidents, British Columbia 1984

TIME OF DAY - 1984	B.C. REGISTERED VEHICLES	NOT B.C. REGISTERED VEHICLES
Midnight to 2 a.m.	6.5%	4.1%
2 a.m. to 4 a.m.	4.8%	3.2%
4 a.m. to 6 a.m.	2.0%	1.4%
6 a.m. to 8 a.m.	4.8%	3.7%
8 a.m. to 10 a.m.	7.5%	7.0%
10 a.m. to Noon	8.4%	8.7%
Noon to 2 p.m.	10.5%	12.3%
2 p.m. to 4 p.m.	13.8%	16.3%
4 p.m. to 6 p.m.	15.2%	17.0%
6 p.m. to 8 p.m.	11.1%	11.9%
8 p.m. to 10 p.m.	8.0%	7.7%
10 p.m. to Midnight	7.4%	6.6%
TOTAL	100.0%	100.0%

TABLE 9
Day of Week - Casualty Traffic Accidents, British Columbia 1984

Registration	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY	TOTAL
B.C. REG. VEHICLE	11.7%	13.0%	13.1%	14.6%	16.6%	16.9%	14.2%	100.0%
NON-B.C. VEHICLE	12.6%	14.1%	14.2%	15.7%	17.5%	15.0%	10.9%	100.0%

TABLE 10
Location on Road - Casualty Traffic Accidents, British Columbia 1984

Registration	INTERSECTION	BETWEEN INTERSECTION	"T" JUNCTION	BRIDGE	OTHER	TOTAL
B.C. REG. VEHICLE	44.3%	40.4%	6.0%	2.2%	7.1%	100.0%
NON-B.C. VEHICLES	42.5%	41.4%	7.8%	2.2%	6.1%	100.0%

TABLE 11
Area Land Use - Casualty Traffic Accidents, British Columbia 1984

	SCHOOL	FAMILY/ RESIDENTIAL	APARTMENT/ RESIDENTIAL	BUSINESS/ SHOPPING	INDUSTRIAL	AGRICULTURAL	PARKS/ RECREATIONAL	TOTAL
B.C. REG. VEHICLES	2.7%	30.1%	5.0%	28.8%	6.5%	24.7%	2.3%	100.0%
NON-B.C. VEHICLES	3.3%	26.5%	5.0%	29.0%	4.4%	27.9%	3.9%	100.0%

DISCUSSION

In addition to general driving experience, familiarity with the general driving environment and specific route taken are important factors in avoiding traffic accidents. The driving environment of British Columbia can be characterized as being comprised of winding mountain roads with little run-off area and of densely packed urban centers. Arguably, both of these sorts of environments draw out-of-province visitors because of their novelty to the visitor, yet this same novelty makes the driving environment a more dangerous one for the visitor than for the local resident.

The results of this study show that, when compared to B.C. registered vehicles in casualty traffic accidents, out-of-province vehicles are involved in a higher proportion of accidents, accidents occurring on any day of the week, (as opposed to primarily during the week-end), accidents occurring in the Summer months, and accidents not involving alcohol. From this, one gets the picture of a tourist on summer holiday travelling during the day. However, the relatively high proportion of out-of-province drivers in fatal accidents driving commercial vehicles and the relatively high proportion of out-of-province drivers in hit-and-run casualty accidents warrants some concern.

SECTION 4

CAUSES AND LOCATIONS OF TRAFFIC ACCIDENTS

Contributing Factors to Casualty Motor Vehicle Crashes in British Columbia, 1984

Locations of Casualty Motor Vehicle Crashes in British Columbia, 1984

Contributing Factors to Casualty Motor Vehicle Crashes in British Columbia, 1984

Contributing Factors to Casualty Motor Vehicle Crashes in British Columbia, 1984

This report consists of a breakdown of selected contributing factors to casualty accidents (i.e. a crash where someone was injured or killed.) Each of the contributing factors was extracted from Traffic Accident Report forms (MV 104) which were submitted to the Motor Vehicle Department of the Ministry of Transportation and Highways by the police department/detachment servicing the location of the crash. It should be noted that as these computer-based files are constantly being updated by the Motor Vehicle Department, any figures produced by that department which contradict figures reported herein ought to be considered correct.

In order to interpret the information in this report, three things need to be kept in mind:

1) In most police departments/detachments, the actual number of casualty accidents is very small, so that a difference of one or two accidents can produce a very large percentage figure. Such large percentages based on a small number of accidents should not be taken as indicating any sort of trend or stable condition. They are most probably entirely random variations from police jurisdiction to police jurisdiction.

2) The contributing factors should be considered in the light of the provincial figures, and these are presented on the first page of this report.

3) Very often there is more than one contributing factor to an accident, therefore these figures can add up to more than 100%.

CONTRIBUTING FACTORS TO CASUALTY MOTOR VEHICLE CRASHES, 1984

LOCATION	No. of Crashes	% Dr. w/o Due Care	% Alcohol Rel'd	% Dr. Unsafe Speed	% Fail to Yield	% Due to Weather	% Fol. too Close	% Veh. Fault
BRITISH COLUMBIA - 1982	24,262	29.7	18.9	16.7	15.7	11.8	7.0	4.1
BRITISH COLUMBIA - 1983	22,911	30.3	17.8	15.8	17.3	10.5	7.3	4.4
BRITISH COLUMBIA - 1984	23,440	29.1	15.2	15.2	17.5	11.1	7.5	4.2
INDEPENDENT POLICE FORCES								
Central Saanich Police	61	42.6.	11.5	11.5	16.4	11.5	9.8	1.6
Delta Municipal Police	408	32.6	17.2	10.3	16.9	10.3	10.0	4.2
Esquimalt Police Department	110	38.2	20.2	10.9	15.5	10.9	7.3	7.3
Matsqui Police Service	396	30.8	9.6	13.1	22.7	15.9	9.6	4.0
Nelson City Police	36	22.2	22.2	19.4	22.2	2.8	8.3	2.8
New Westminster Police	462	16.0	14.3	8.2	19.9	8.2	8.2	2.2
Oak Bay Police Department	69	14.5	5.8	10.1	40.6	7.2	7.2	5.8
Port Moody Police Dept.	119	35.3	11.8	9.2	10.9	13.4	14.3	4.2
Saanich Police Department	480	30.6	10.0	13.3	21.0	9.8	9.6	4.0
Vancouver City Police	3387	20.5	10.6	7.2	26.8	7.1	3.5	3.0
Victoria City Police	750	27.1	11.3	7.3	21.7	3.6	9.3	4.0
West Vancouver Police Dept.	281	24.2	10.3	16.0	9.6	7.1	9.6	2.8
FEDERAL AGENCIES								
Military Police	9	33.3	22.2	55.6	0.0	44.4	11.1	0.0
National Harbours Board Pol.	6	66.7	33.3	50.0	0.0	33.3	0.0	33.3
ROYAL CANADIAN MOUNTED POLICE								
AUTONOMOUS DETACHMENTS								
Burnaby	1392	34.2	9.2	12.1	26.9	8.7	10.8	3.0
Coquitlam Rural	89	14.6	6.7	11.2	4.5	4.5	3.4	1.1
Coquitlam Municipal	419	20.8	13.8	9.8	18.6	8.4	7.2	3.8
Port Coquitlam	194	31.4	17.0	10.3	11.9	11.9	6.7	3.6
North Vancouver City	263	38.0	12.2	9.9	29.3	8.4	16.0	1.9
North Vancouver District	276	42.4	14.9	14.5	22.1	10.9	13.8	4.7
Richmond Township	802	34.0	8.6	9.6	27.4	10.6	12.5	3.4
Surrey	1516	24.1	14.3	8.4	20.6	9.2	11.6	3.0
CHILLIWACK SUB-DIVISION								
Abbotsford Rural	4	50.0	0.0	50.0	0.0	50.0	0.0	0.0
Abbotsford Municipal	112	32.1	21.4	12.5	17.9	8.9	7.1	2.7
Agassiz	80	37.5	38.8	22.5	13.8	2.5	2.5	5.0
Boston Bar	47	25.5	14.9	27.7	0.0	25.5	2.1	6.4
Chilliwack Rural	37	27.0	27.0	37.8	0.0	2.7	2.7	5.4
Chilliwack Municipal	293	27.3	22.9	16.4	15.7	7.8	6.5	2.4
Hope	147	26.5	12.9	32.0	2.0	27.9	4.1	7.5
Mission Rural	23	39.1	13.0	21.7	17.4	26.1	4.3	8.7
Mission Municipal	113	32.7	17.7	18.6	15.0	14.2	8.0	5.3
Sumas Freeway Patrol (Unit C)	83	26.5	21.7	18.1	3.6	26.5	2.4	12.0

LOCATION	No. of Crashes	% Dr. w/o Due Care	% Alcohol Rel'd	% Dr. Unsafe Speed	% Fail to Yield	% Due to Weather	% Fol. too Close	% Veh. Fault
COURTENAY SUB-DIVISION								
Alert Bay	5	60.0	20.0	0.0	0.0	0.0	0.0	0.0
Campbell River Rural	74	33.8	17.6	47.3	5.4	32.4	5.4	6.8
Campbell River Municipal	130	37.7	20.0	12.3	23.8	6.2	13.8	4.6
Comox Municipal	30	43.3	36.7	20.0	10.0	3.3	0.0	3.3
Courtenay Rural	170	37.1	21.2	24.7	7.1	10.0	2.9	2.9
Courtenay Municipal	100	35.0	11.0	11.0	24.0	8.0	10.0	1.0
Gold River	22	27.3	9.1	36.4	0.0	18.2	4.5	4.5
Parksville	143	45.5	16.1	32.9	9.8	7.7	7.7	8.4
Port Alberni Rural	104	40.4	19.2	37.5	3.8	16.3	2.9	8.7
Port Alberni Municipal	99	44.4	21.2	16.2	20.2	11.1	9.1	2.0
Port Alice	10	40.0	20.0	20.0	0.0	30.0	0.0	20.0
Port Hardy	62	32.3	32.3	16.1	8.1	6.5	3.2	6.5
Port McNeill	46	17.4	19.6	26.1	4.3	13.0	2.2	2.2
Powell River Rural	38	26.3	18.4	34.2	5.3	18.4	2.6	7.9
Powell River Municipal	53	35.8	18.9	11.3	13.2	7.5	1.9	11.3
Quadra Island	8	62.5	25.0	12.5	0.0	25.0	0.0	25.0
Sayward	27	25.9	14.8	18.5	3.7	40.7	0.0	7.4
Tahsis	2	50.0	50.0	50.0	0.0	50.0	0.0	0.0
Tofino	12	25.0	25.0	8.3	8.3	25.0	0.0	16.7
Ucluelet	22	18.2	18.2	31.8	4.5	22.7	0.0	9.1
KAMLOOPS SUB-DIVISION								
Alexis Creek	19	42.1	36.8	26.3	0.0	21.1	0.0	10.5
Anahim Lake	14	28.6	35.7	35.7	0.0	0.0	7.1	21.4
Ashcroft	37	16.2	10.8	16.2	8.1	10.8	0.0	2.7
Barriere	35	17.1	14.3	42.9	0.0	31.4	0.0	5.7
Blue River	7	0.0	14.3	0.0	0.0	42.9	0.0	14.3
Chase	59	30.5	22.0	18.6	0.0	15.3	0.0	6.8
Clearwater	40	25.0	15.0	20.0	15.0	35.0	0.0	5.0
Clinton	42	28.6	11.9	23.8	0.0	21.4	2.4	11.9
100 Mile House	109	27.5	19.3	27.5	7.3	18.3	3.7	9.2
Kamloops Rural	93	41.9	23.7	32.3	3.2	19.4	1.1	6.5
Kamloops Municipal	458	43.2	15.5	13.3	20.1	6.6	12.4	2.2
Lillooet	48	20.8	25.0	33.3	6.3	16.7	0.0	4.2
Logan Lake	12	25.0	58.3	33.3	0.0	8.3	0.0	8.3
Lytton	38	31.6	21.1	21.1	2.6	15.8	7.9	13.2
Merritt Rural	57	31.6	38.6	42.1	1.8	10.5	1.8	8.8
Merritt Municipal	29	44.8	17.2	10.3	17.2	3.4	6.9	0.0
Spences Bridge	31	29.0	12.9	32.3	0.0	16.1	0.0	9.7
Valemount	39	23.1	10.3	10.3	0.0	38.5	0.0	2.6
Williams Lake Rural	145	33.1	18.6	24.8	0.7	18.6	0.0	4.1
Williams Lake Municipal	96	36.5	29.2	17.7	17.7	4.2	5.2	4.2
KELOWNA SUB-DIVISION								
Armstrong	43	34.9	25.6	39.5	4.7	18.6	2.3	7.0
Enderby	48	14.6	18.8	33.3	8.3	14.6	2.1	6.3
Falkland	28	32.1	21.4	17.9	0.0	35.7	3.6	7.1
Kelowna Rural	193	32.6	20.7	21.8	5.7	13.5	7.3	4.7
Kelowna Municipal	484	36.2	19.6	14.3	16.9	8.7	13.4	2.7

LOCATION	No. of Crashes	% Dr. w/o Due Care	% Alcohol Rel'd	% Dr. Unsafe Speed	% Fail to Yield	% Due to Weather	% Fol. too Close	% Veh. Fault
Keremeos	57	24.6	22.8	26.3	7.0	17.5	3.5	5.3
Lumby	36	27.8	11.1	33.3	2.8	16.7	0.0	13.9
Oliver	46	30.4	13.0	28.3	4.3	4.3	4.3	4.3
Osoyoos	40	32.5	17.5	22.5	0.0	10.0	5.0	2.5
Penticton Rural	72	26.4	18.1	30.6	12.5	18.1	2.8	6.9
Penticton Municipal	150	26.0	14.0	13.3	23.3	0.7	8.0	5.3
Princeton	101	30.7	11.9	39.6	5.9	23.8	1.0	6.9
Revelstoke	114	26.3	14.0	21.9	9.6	18.4	5.3	4.4
Salmon Arm Rural	38	36.8	36.8	21.1	2.6	5.3	2.6	5.3
Salmon Arm Municipal	63	31.7	22.2	25.4	17.5	6.3	6.3	3.2
Sicamous	37	18.9	8.1	18.9	8.1	21.6	5.4	5.4
Summerland Municipal	42	28.6	14.3	14.3	11.9	14.3	4.8	2.4
Vernon Rural	142	27.5	25.4	31.0	9.2	14.8	4.2	5.6
Vernon Municipal	173	22.5	16.8	13.9	31.8	5.8	5.2	2.3
NELSON SUB-DIVISION								
Castlegar Rural	48	35.4	16.7	18.8	0.0	12.5	2.1	8.3
Castlegar Municipal	42	28.6	26.2	11.9	19.0	14.3	9.5	2.4
Cranbrook Rural	67	19.4	13.4	14.9	4.5	22.4	1.5	7.5
Cranbrook Municipal	63	22.2	6.3	17.5	39.7	14.3	4.8	4.8
Crescent Valley	34	14.7	32.4	17.6	2.9	20.6	5.9	0.0
Creston	96	20.8	22.9	18.8	3.1	21.9	2.1	8.3
Elkford	10	10.0	10.0	20.0	0.0	50.0	0.0	0.0
Fernie	61	44.3	14.8	21.3	13.1	14.8	6.6	8.2
Field	10	40.0	20.0	10.0	10.0	40.0	0.0	0.0
Fruitvale	23	34.8	13.0	34.8	13.0	30.4	0.0	4.3
Golden	97	37.1	16.5	29.9	2.1	24.7	2.1	12.4
Grand Forks	59	35.6	22.0	10.2	10.2	16.9	1.7	0.0
Invermere	47	21.3	23.4	14.9	2.1	12.8	6.4	6.4
Kaslo	15	33.3	26.7	40.0	6.7	20.0	0.0	6.7
Kimberley Rural	29	13.8	20.7	20.7	3.4	13.8	0.0	0.0
Kimberley Municipal	21	4.8	14.3	14.3	23.8	23.8	4.8	0.0
Midway	16	25.0	18.8	18.8	0.0	12.5	6.3	12.5
Nakusp	23	43.5	26.1	21.7	4.3	17.4	0.0	8.7
Nelson	35	31.4	17.1	22.9	2.9	20.0	2.9	2.9
New Denver	9	22.2	11.1	33.3	0.0	0.0	0.0	11.1
Radium	36	8.3	22.2	11.1	5.6	19.4	2.8	5.6
Rossland	20	15.0	0.0	5.0	10.0	15.0	0.0	5.0
Salmo	25	12.0	12.0	16.0	8.0	16.0	0.0	8.0
Sparwood	41	41.5	22.0	19.5	4.9	22.0	0.0	2.4
Trail Rural	19	47.4	26.3	15.8	5.3	21.1	0.0	0.0
Trail Municipal	43	37.2	9.3	11.6	20.9	11.6	9.3	9.3
PRINCE GEORGE SUB-DIVISION								
Burns Lake	59	22.0	22.0	20.3	5.1	11.9	1.7	6.8
Chetwynd	69	24.6	7.2	18.8	2.9	37.7	2.9	4.3
Dawson Creek Rural	56	41.1	12.5	28.6	5.4	5.4	1.8	5.4
Dawson Creek Municipal	47	19.1	14.9	12.8	38.3	0.0	4.3	2.1
Fort Nelson	66	33.3	19.7	39.4	1.5	13.6	0.0	4.5
Fort St. James	29	44.8	37.9	41.4	0.0	13.8	0.0	6.9

LOCATION	No. of Crashes	% Dr. w/oDue Care	% Alcohol Rel'd	% Dr. Unsafe Speed	% Fail to Yield	% Due to Weather	% Fol. too Close	% Veh. Fault
Fort St. John Rural	70	37.1	18.6	25.7	4.3	11.4	4.3	8.6
Fort St. John Municipal	57	21.1	19.3	21.1	24.6	3.5	14.0	1.8
Fraser Lake	28	32.1	17.9	7.1	3.6	14.3	0.0	14.3
Hudson Hope	9	22.2	22.2	22.2	0.0	11.1	0.0	11.1
Mackenzie Rural	30	26.7	13.3	26.7	0.0	20.0	0.0	10.0
Mackenzie Municipal	14	28.6	7.1	21.4	0 0	0.0	7.1	0.0
McBride	32	40.6	15.6	3.1	9.4	6.3	0.0	3.1
Prince George Rural	166	30.1	15.1	26.5	1.8	13.9	1.2	4.2
Prince George City	415	35.7	19.3	17.3	19.8	8.2	6.5	2.7
Quesnel Rural	115	30.4	18.3	21.7	6.1	18.3	4.3	2.6
Quesnel Municipal	90	36.7	14.4	15.6	14.4	15.6	10.0	2.2
Tumbler Ridge	38	34.2	15.8	39.5	0.0	23.7	0.0	5.3
Vanderhoof	63	34.9	20.6	23.8	6.3	19.0	4.8	0.0
Watson Lake, Teslin	5	40.0	0.0	20.0	0.0	20.0	0.0	0.0
Wells	11	18.2	18.2	54.5	0.0	27.3	0.0	9.1
PRINCE RUPERT SUB-DIVISION								
Atlin	5	40.0	20.0	40.0	0.0	0.0	0.0	0.0
Bella Bella	1	100.0	100.0	100.0	0.0	0.0	0.0	0.0
Bella Coola	13	46.2	38.5	38.5	0.0	23.1	0.0	7.7
Cassiar	23	26.1	17.4	30.4	0.0	13.0	0.0	0.0
Dease Lake	21	23.8	14.3	23.8	0.0	23.8	4.8	0.0
Granisle	6	16.7	16.7	33.3	0.0	33.3	0.0	16.7
Hazelton	71	16.9	18.3	14.1	2.8	35.2	4.2	9.9
Houston	40	25.0	17.5	20.0	2.5	20.0	2.5	7.5
Kitimat Rural	9	33.3	0.0	22.2	11.1	44.4	0.0	11.1
Kitimat Municipal	40	50.0	30.0	25.0	5.0	20.0	0.0	7.5
Masset	25	28.0	20.0	16.0	4.0	8.0	0.0	4.0
New Aiyansh	7	42.9	57.1	14.3	14.3	0.0	0.0	0.0
Prince Rupert Rural	32	28.1	15.6	34.4	9.4	28.1	0.0	3.1
Prince Rupert City	81	30.9	24.7	17.3	21.0	9.9	4.9	9.9
Queen Charlotte	20	35.0	40.0	45.0	0.0	5.0	5.0	5.0
Smithers	67	37.3	31.3	20.9	10.4	11.9	3.0	0.0
Stewart	24	20.8	25.0	16.7	4.2	37.5	4.2	0.0
Terrace Rural	77	19.5	14.3	39.0	6.5	24.7	3.9	2.6
Terrace Municipal	57	19.3	28.1	22.8	22.8	12.3	1.8	7.0
VANCOUVER SUB-DIVISION								
Gibsons	66	43.9	28.8	18.2	9.1	10.6	1.5	9.1
Langley City	178	26.4	10.7	9.6	31.5	9.0	5.6	2.8
Langley Township	357	27.7	17.4	17.9	18.8	10.9	7.0	4.2
Maple Ridge Rural	46	21.7	17.4	19.6	21.7	13.0	6.5	2.2
Maple Ridge Municipal	210	29.5	21.9	14.3	18.6	11.4	6.2	6.2
Pemberton	30	10.0	16.7	26.7	0.0	13.3	0.0	16.7
Sechelt	61	29.5	26.2	31.1	6.6	14.8	1.6	11.5
Squamish Rural	58	31.0	13.8	19.0	3.4	15.5	5.2	1.7
Squamish Municipal	61	32.8	27.9	23.0	11.5	14.8	4.9	6.6
University	71	25.4	11.3	21.1	32.4	16.9	11.3	7.0
Vancouver-Bowen Island	4	25.0	25.0	50.0	0.0	25.0	0.0	0.0
Whistler	26	30.0	15.4	11.5	0.0	30.8	7.7	11.5
White Rock	64	34.4	12.5	10.9	29.7	1.6	9.4	3.1
Deas Isle Freeway Patrol Unit A	132	32.6	11.4	14.4	5.3	18.9	18.9	3.8
Port Mann Freeway Patrol Unit B	389	33.9	7.7	17.5	1.8	13.6	22.4	5.9
VICTORIA SUB-DIVISION								
Chemainus	38	34.2	34.2	21.1	10.5	18.4	2.6	7.9
Colwood	282	39.7	23.8	21.6	11.3	16.3	13.5	5.0
Duncan	133	36.8	17.3	21.1	24.8	10.5	9.8	4.5
Duncan - North Cowichan	94	35.1	22.3	29.8	9.6	14.9	4.3	5.3
Gabriola Island	17	35.3	35.3	41.2	0.0	5.9	11.8	11.8
Ganges	47	21.3	12.8	34.0	17.0	10.6	4.3	6.4
Ladysmith	60	28.3	21.7	13.3	10.0	10.0	15.0	5.0
Lake Cowichan	36	33.3	44.4	25.0	2.8	11.1	5.6	8.3
Nanaimo Rural	55	25.5	14.5	18.2	20.0	5.5	9.1	10.9
Nanaimo Municipal	427	25.3	14.1	14.5	20.6	8.9	12.9	6.1
Pender Island	6	16.7	16.7	16.7	0.0	16.7	0.0	0.0
Shawnigan Lake	72	37.5	13.9	16.7	2.8	12.5	1.4	2.8
Sidney Rural	8	37.5	50.0	12.5	0.0	0.0	0.0	0.0
Sidney Municipal	79	38.0	19.0	16.5	17.7	16.5	5.1	2.5
Sooke	87	39.1	20.7	33.3	2.3	14.9	4.6	6.9

Locations of Casualty Motor
Vehicle Crashes in British Columbia, 1984

Locations of Casualty Motor Vehicle Crashes in British Columbia, 1984

This report consists of a breakdown of the locations of casualty accidents (i.e. a crash where someone was injured or killed.) Each of the locations was extracted from the Traffic Accident Report forms (MV 104) which were submitted to the Motor Vehicle Department of the Ministry of Transportation and Highways by the police department/detachment servicing the location of the crash. It should be noted that as these computer-based files are constantly being updated by the Motor Vehicle Department, any figures produced by that department which contradict figures reported herein ought to be considered correct.

In order to interpret the information in this report, two things need to be kept in mind:

1) In most police departments/detachments, the actual number of casualty accidents is very small, so that a difference of one or two accidents can produce a very large percentage figure. Such large percentages based on a small number of accidents should not be taken as indicating any sort of trend or stable condition. They are most probably entirely random variations from police jurisdiction to police jurisdiction.

2) The location codes should be considered in the light of the provincial figures, and these are presented on the first page of the report.

LOCATIONS OF CASUALTY MOTOR VEHICLE CRASHES, 1984

POLICE REPORTING GROUP	No. of Crashes	% At Intersection	% Between Intersection	% "T" Junction	% Bridge	% Other
BRITISH COLUMBIA - 1984	23,440	44.1	40.5	6.2	2.2	7.1
INDEPENDENT POLICE FORCES						
Central Saanich Police	61	42.6	45.9	4.9	0.0	6.6
Delta Municipal Police	408	44.6	32.1	11.8	0.0	11.5
Esquimalt Police Department	110	49.5	33.9	10.1	0.0	6.4
Matsqui Police Service	396	47.2	28.5	16.2	1.0	7.1
Nelson City Police	36	56.8	35.1	2.7	0.0	5.4
New Westminster Police	462	61.0	30.3	3.4	2.3	3.0
Oak Bay Police Department	69	55.1	34.8	5.8	0.0	4.3
Port Moody Police Dept.	119	41.2	48.7	5.0	0.0	5.0
Saanich Police Department	480	48.0	30.0	13.4	0.0	8.6
Vancouver City Police	3387	63.2	29.6	3.2	1.3	2.9
Victoria City Police	750	61.2	28.5	6.5	0.7	3.2
West Vancouver Police Dept.	281	31.7	39.9	3.0	12.5	12.9
FEDERAL AGENCIES						
Military Police	9	11.1	22.2	11.1	0.0	55.6
National Harbours Board Pol.	5	20.0	0.0	0.0	0.0	80.0
ROYAL CANADIAN MOUNTED POLICE						
AUTONOMOUS DETACHMENTS						
Burnaby	1392	61.6	28.5	6.0	0.2	3.2
Coquitlam Rural	89	53.2	32.9	3.8	2.5	7.6
Coquitlam Municipal	419	56.0	29.0	5.6	0.0	9.5
Port Coquitlam	194	43.5	39.9	4.1	4.7	7.8
North Vancouver City	263	57.2	33.0	5.7	0.0	4.2
North Vancouver District	276	47.1	38.7	5.5	0.7	8.0
Richmond Township	802	49.1	27.3	11.8	2.6	9.2
Surrey	1516	53.4	31.8	9.2	0.6	5.0
CHILLIWACK SUB-DIVISION						
Abbotsford Rural	3	33.3	0.0	0.0	0.0	66.7
Abbotsford Municipal	112	38.2	40.9	10.0	1.8	9.1
Agassiz	80	41.3	52.5	1.3	0.0	5.0
Boston Bar	47	7.3	65.9	2.4	12.2	12.2
Chilliwack Rural	37	3.3	76.7	3.3	0.0	16.7
Chilliwack Municipal	293	40.5	40.5	12.2	0.0	6.8
Hope	147	9.6	80.1	2.1	4.8	3.4
Mission Rural	23	27.3	45.5	4.5	9.1	13.6
Mission Municipal	113	43.2	37.8	6.3	1.8	10.8
Sumas Freeway Patrol (Unit C)	83	12.5	63.8	0.0	5.0	18.8

POLICE REPORTING GROUP	No. of Crashes	% At Intersection	% Between Intersection	% "T" Junction	% Bridge	% Other
COURTENAY SUB-DIVISION						
Alert Bay	5	0.0	33.3	66.7	0.0	0.0
Campbell River Rural	74	12.9	70.0	7.1	2.9	7.1
Campbell River Municipal	130	48.1	34.9	8.5	0.8	7.8
Comox Municipal	30	53.6	35.7	0.0	0.0	10.7
Courtenay Rural	170	25.5	58.6	5.7	0.6	9.6
Courtenay Municipal	100	58.6	27.3	7.1	0.0	7.1
Gold River	22	9.5	85.7	0.0	4.8	0.0
Parksville	143	35.7	45.5	7.7	1.4	9.8
Port Alberni Rural	104	10.0	64.0	7.0	4.0	15.0
Port Alberni Municipal	99	49.0	38.8	5.1	2.0	5.1
Port Alice	10	0.0	60.0	0.0	0.0	40.0
Port Hardy	62	23.3	63.3	5.0	1.7	6.7
Port McNeill	46	20.0	66.7	4.4	2.2	6.7
Powell River Rural	38	13.9	77.8	0.0	0.0	8.3
Powell River Municipal	53	30.8	50.0	13.5	0.0	5.8
Quadra Island	8	12.5	87.5	0.0	0.0	0.0
Sayward	27	14.8	74.1	0.0	11.1	0.0
Tahsis	2	0.0	100.0	0.0	0.0	0.0
Tofino	12	33.3	66.7	0.0	0.0	0.0
Ucluelet	22	5.9	82.4	5.9	0.0	5.9
KAMLOOPS SUB-DIVISION						
Alexis Creek	19	5.3	94.7	0.0	0.0	0.0
Anahim Lake	14	14.3	64.3	0.0	0.0	21.4
Ashcroft	37	5.4	89.2	5.4	0.0	0.0
Barriere	35	0.0	88.2	0.0	5.9	5.9
Blue River	7	0.0	85.7	0.0	0.0	14.3
Chase	59	20.3	62.7	5.1	1.7	10.2
Clearwater	40	5.3	73.7	5.3	5.3	10.5
Clinton	42	11.9	78.6	4.8	0.0	4.8
100 Mile House	109	13.1	77.6	7.5	0.0	1.9
Kamloops Rural	93	14.7	76.0	1.3	0.0	8.0
Kamloops Municipal	458	49.8	29.8	7.5	2.6	10.3
Lillooet	48	8.3	79.2	0.0	0.0	12.5
Logan Lake	12	9.1	54.5	0.0	0.0	36.4
Lytton	38	0.0	84.2	2.6	2.6	10.5
Merritt Rural	57	5.7	71.7	5.7	1.9	15.1
Merritt Municipal	29	44.8	27.6	13.8	3.4	10.3
Spences Bridge	31	3.3	83.3	0.0	10.0	3.3
Valemount	39	2.6	76.3	5.3	2.6	13.2
Williams Lake Rural	145	12.9	75.0	5.0	0.7	6.4
Williams Lake Municipal	96	44.1	29.0	10.8	1.1	15.5
KELOWNA SUB-DIVISION						
Armstrong	43	23.8	59.5	14.3	0.0	2.4
Enderby	48	33.3	46.7	6.7	0.0	13.3
Falkland	28	11.1	77.8	3.7	0.0	7.4
Kelowna Rural	193	32.8	56.5	2.2	2.2	6.5
Kelowna Municipal	484	54.4	34.0	4.8	1.5	5.4

POLICE REPORTING GROUP	No. of Crashes	% At Intersection	% Between Intersection	% "T" Junction	% Bridge	% Other
Keremeos	57	14.0	75.4	5.3	3.5	1.8
Lumby	36	9.1	72.7	0.0	3.0	15.2
Oliver	46	27.9	58.1	2.3	2.3	9.3
Osoyoos	40	21.1	68.4	5.3	0.0	5.3
Penticton Rural	72	14.1	64.8	1.4	1.4	18.3
Penticton Municipal	150	50.3	32.7	6.1	0.7	10.2
Princeton	101	9.6	84.0	0.0	2.1	4.3
Revelstoke	114	15.5	60.0	2.7	8.2	13.6
Salmon Arm Rural	38	16.2	75.7	5.4	0.0	2.7
Salmon Arm Municipal	63	42.6	41.0	8.2	3.3	4.9
Sicamous	37	27.3	42.4	6.1	9.1	15.2
Summerland Municipal	42	50.0	42.5	7.5	0.0	0.0
Vernon Rural	142	20.7	70.0	6.4	0.0	2.9
Vernon Municipal	173	61.0	30.2	6.4	0.0	2.3
NELSON SUB-DIVISION						
Castlegar Rural	48	14.9	68.1	2.1	2.1	12.8
Castlegar Municipal	42	45.2	38.1	4.8	0.0	11.9
Cranbrook Rural	67	14.1	76.6	3.1	4.7	1.6
Cranbrook Municipal	63	62.9	24.2	8.1	0.0	4.8
Crescent Valley	34	13.3	80.0	6.7	0.0	0.0
Creston	96	20.0	60.0	4.2	5.3	10.5
Elkford	10	11.1	88.9	0.0	0.0	0.0
Fernie	61	37.5	50.0	3.6	1.8	7.1
Field	10	20.0	50.0	0.0	0.0	30.0
Fruitvale	23	8.7	60.9	8.7	8.7	13.0
Golden	97	15.8	55.8	1.1	9.5	17.9
Grand Forks	59	24.6	56.1	3.5	1.8	14.0
Invermere	47	15.2	67.4	10.9	4.3	2.2
Kaslo	15	8.3	75.0	8.3	0.0	8.3
Kimberley Rural	29	21.4	60.7	3.6	3.6	10.7
Kimberley Municipal	21	47.6	38.1	14.3	0.0	0.0
Midway	16	12.5	87.5	0.0	0.0	0.0
Nakusp	23	19.0	47.6	9.5	0.0	23.8
Nelson	35	11.8	82.4	0.0	2.9	2.9
New Denver	9	11.1	88.9	0.0	0.0	0.0
Radium	36	16.7	72.2	5.6	0.0	5.6
Rossland	20	31.6	68.4	0.0	0.0	0.0
Salmo	25	16.0	76.0	4.0	4.0	0.0
Sparwood	41	20.5	66.7	0.0	10.3	2.6
Trail Rural	19	15.8	73.7	5.3	0.0	5.3
Trail Municipal	43	51.2	39.0	0.0	2.4	7.3
PRINCE GEORGE SUB-DIVISION						
Burns Lake	59	19.6	53.6	10.7	1.8	14.3
Chetwynd	69	14.5	66.7	7.2	4.3	7.2
Dawson Creek Rural	56	25.0	69.6	1.8	1.8	1.8
Dawson Creek Municipal	47	57.4	34.0	4.3	0.0	4.3
Fort Nelson	66	9.2	78.5	3.1	0.0	9.2
Fort St. James	29	8.3	54.2	4.2	4.2	29.2

POLICE REPORTING GROUP	of Crashes	Inter-section	Inter-section	Junct-ion	Bridge	Other
Fort St. John Rural	70	16.2	69.1	2.9	2.9	8.8
Fort St. John Municipal	57	58.6	29.3	3.4	0.0	8.6
Fraser Lake	28	17.9	78.6	3.6	0.0	0.0
Hudson Hope	9	0.0	50.0	25.0	0.0	25.0
Mackenzie Rural	30	3.3	70.0	0.0	6.7	20.0
Mackenzie Municipal	14	30.8	30.8	7.7	0.0	30.8
McBride	32	21.9	68.8	3.1	0.0	6.3
Prince George Rural	166	8.0	72.4	6.7	1.8	11.0
Prince George City	415	54.7	30.4	8.7	1.0	5.2
Quesnel Rural	115	25.7	63.8	3.8	1.0	5.7
Quesnel Municipal	90	50.0	31.0	9.5	4.8	0.2
Tumbler Ridge	38	10.5	63.2	5.3	7.9	13.2
Vanderhoof	63	23.8	61.9	4.8	1.6	7.9
Watson Lake, Teslin	5	0.0	100.0	0.0	0.0	0.0
Wells	11	0.0	44.4	0.0	11.1	44.4
PRINCE RUPERT SUB-DIVISION						
Atlin	5	0.0	40.0	0.0	0.0	60.0
Bella Bella	1	0.0	100.0	0.0	0.0	0.0
Bella Coola	13	0.0	69.2	15.4	0.0	15.4
Cassiar	23	4.5	81.8	0.0	4.5	9.1
Dease Lake	21	9.5	81.0	0.0	0.0	9.5
Granisle	6	16.7	66.7	16.7	0.0	0.0
Hazelton	71	11.8	69.1	2.9	2.9	13.2
Houston	40	19.5	65.9	0.0	2.4	12.2
Kitimat Rural	9	0.0	66.7	0.0	11.1	22.2
Kitimat Municipal	40	30.8	51.3	5.1	7.7	5.1
Masset	25	16.0	80.0	0.0	0.0	4.0
New Aiyansh	7	0.0	85.7	0.0	14.3	0.0
Prince Rupert Rural	32	19.4	71.0	0.0	3.2	6.5
Prince Rupert City	81	43.2	45.7	4.9	0.0	6.2
Queen Charlotte	20	17.6	41.2	23.5	0.0	17.6
Smithers	67	27.0	61.9	1.6	1.6	7.9
Stewart	24	13.6	77.3	0.0	0.0	9.1
Terrace Rural	77	17.6	71.6	2.7	1.4	6.8
Terrace Municipal	57	50.9	38.6	1.8	0.0	8.8
VANCOUVER SUB-DIVISION						
Gibsons	66	12.1	62.1	13.6	1.5	10.6
Langley City	178	59.2	21.8	12.8	0.0	6.1
Langley Township	357	45.4	32.8	10.4	0.8	10.6
Maple Ridge Rural	46	45.7	34.8	10.9	6.5	2.2
Maple Ridge Municipal	210	49.0	35.2	11.0	0.0	4.8
Pemberton	30	3.3	66.6	3.3	0.0	26.7
Sechelt	61	20.0	70.9	3.6	0.0	5.5
Squamish Rural	58	10.9	70.9	0.0	5.5	12.7
Squamish Municipal	61	29.8	45.6	3.5	3.5	17.5
University	71	54.4	29.4	4.4	0.0	11.8
Vancouver-Bowen Island	4	0.0	75.0	0.0	0.0	25.0
Whistler	26	25.0	37.5	20.8	0.0	16.7

POLICE REPORTING GROUP	No. of Crashes	% At Intersection	% Between Intersection	% "T" Junction	% Bridge	% Other
White Rock	64	54.8	35.5	3.2	0.0	6.5
Deas Isle Freeway Patrol (Unit A)	132	15.9	43.2	3.0	8.3	29.5
Port Mann Freeway Patrol (Unit B)	389	6.0	44.2	0.7	32.4	16.7
VICTORIA SUB-DIVISION						
Chemainus	38	18.9	56.8	8.1	5.4	10.8
Colwood	282	36.0	42.5	8.7	0.4	12.4
Duncan	133	54.2	30.5	9.9	2.3	3.1
Duncan - North Cowichan	94	29.2	47.2	14.6	5.6	3.4
Gabriola Island	17	33.3	60.0	6.7	0.0	0.0
Ganges	47	34.0	57.4	8.5	0.0	0.0
Ladysmith	60	37.3	47.5	6.8	5.1	3.4
Lake Cowichan	36	21.1	69.7	3.0	6.1	9.1
Nanaimo Rural	55	37.0	53.7	3.7	0.0	5.6
Nanaimo Municipal	427	55.9	30.4	4.0	0.9	8.7
Pender Island	6	16.7	83.3	0.0	0.0	0.0
Shawnigan Lake	72	24.6	56.9	3.1	3.1	12.3
Sidney Rural	8	0.0	100.0	0.0	0.0	0.0
Sidney Municipal	79	41.6	45.5	5.2	0.0	7.8
Sooke	87	19.0	64.3	3.6	4.8	8.3

APPENDIX A

EXECUTIVE SUMMARY OF COUNTERATTACK TRAFFIC RESEARCH PAPERS, 1984,
MINISTRY OF ATTORNEY GENERAL, BRITISH COLUMBIA, 1985

EXECUTIVE SUMMARIES

THE COUNTERATTACK PROGRAM

CounterAttack is a joint program of the Ministry of Attorney General and the Insurance Corporation of British Columbia with a combined budget of $600,000. per year. Its purpose is to reduce drinking driving casualties through programs of visible police enforcement, public information and education, and research and evaluation. It is estimated that CounterAttack has kept alcohol-related casualty accidents to about 10% less than would be expected without the program, and this in turn results in a yearly savings of about 30 lives, 850 injuries and $10 million which would otherwise be paid out in insurance, hospital and justice system costs.

THE MEASUREMENT OF "ALCOHOL INVOLVEMENT"

Using American police and coroners' reports, J.C. Fell in Tracking the Alcohol Involvement Problem in U.S. Highway Crashes (27th Annual Proceedings, American Assiciation for Automotive Medicine, 1983) notes that when the police designate a driver to have "alcohol involvement", they are in error about 5% of the time. He also indicates that, using both coroner and police data in combination, nationally alcohol was involved in 55-58% of fatal accidents, 17% of injury-only accidents, 8% of property damage only accidents, and 11% of all accidents. However, the problem of the role of alcohol and how it relates to these figures is still unanswered. The presence or absence of alcohol, except at very high BAC levels, does not necessarily guarantee it a role in the cause of the accident. It is clear from this discussion that the police, when judging the role of alcohol as a contributing factor to casualty traffic accidents, produce figures which are less than those which speak to the presence or absence of alcohol, and that their figures on causation show a greater difference for fatal accidents (which comprise abouty 2% of their accident investigation burden) than for injury-only accidents (which comprise about 98% of their accident investigation burden).

While it is important to more precisely determine the magnitude of the difference between police judgement of alcohol as a causative factor and the presence of alcohol-- and this can only be done through ongoing hospital and coroner studies--two things can be suggested concerning alcohol as a significant contributing factor to casualty accidents as indicated on the Traffic Accident Report Form (MV104) completed by the attending officer at these accidents. First, that the MV104 data can probably be taken as an accurate (i.e. reliable and valid) indicator of changes in the rate of alcohol involvement over time. And second, that the police data are probably a reasonable indicator of both the role and presence of alcohol in injury-only accidents, however can only be seen as a measure of the role, not absolute chemical presence or level, of alcohol in fatal accidents.

Finally, while studies tend to show that the police, when asked, are about 90% accurate in their judgement of the presence or absence of alcohol, perhaps the only way to determine this level of accuracy for the B.C. police forces is to change the MV104 so that they are required not only to judge whether or not alcohol played a significant role in the accident under investigation, but also judge its presence as well.

PUBLIC OPINIONS ON AND KNOWLEDGE OF DRINKING DRIVING

The following is an overview of a British Columbia wide telephone survey of persons over 15 years of age, done in order to investigate their opinions and beliefs concerning drinking driving. The survey was designed by the CounterAttack Program and was carried out by Mark Trend, an independent research firm. The highlights are:

* The respondents realized that people are more likely to be in a traffic accident if they have been drinking than if they have not.

* The respondents underestimated the likelihood of being convicted if charged with Driving While Impaired (DWI).

* The CounterAttack "BATmobile" and "call the police" television messages were the most frequently mentioned anti-drinking driving messages.

* When asked to name groups or organizations associated with drinking driving, the most frequently mentioned group was Mothers Against Drunk Driving (MADD), followed by the Government, the Police, and all tied, CounterAttack, Alcoholics Anonymous, and citizen's groups.

* About a third of the respondents admitted to being a drinking driver or a passenger with one in the previous month, and 7% admitted to having at some time been charged with DWI.

* When asked what should be done in order to reduce drinking driving, the respondents suggested increased penalties, increased apprehension rates, and increased education, in that order. Generally, the penalties sugggested involved licence suspension, jail terms, and fines, all in excess of currently used levels. However, there was a clear distincition made among different offence consequences. For example, the average fine suggested for a first offence was $849.00, for a second offence, $1,234.00, for causing an accident without injury, $1,121.00, and for causing an accident producing injury or death, $2,572.00.

* About 85% thought that drinking driving was a very serious or extremely serious problem.

* Over 90% could correctly estimate the number of drinks that it would take an average person to become legally impaired.

* About 70% had no idea of the penalties for a DWI first offence, and of the remainder, not one person could correctly name the penalties.

DRIVER AGE AND CASUALTY TRAFFIC ACCIDENTS

The Relationship between Drivers' Age and Seven Commonly Cited Contributing Factors to Casualty Traffic Accidents, British Columbia, 1982

It is clear that the contributing factors to casualty traffic accidents varied from age group to age group. Specifically, Driving Without Due Care, Unsafe Speed, Alcohol Involvement, and Vehicle Fault were more frequently cited for younger drivers than for older drivers. For drivers between 26-50 years of age, the order of importance of contributing factors was similar to that for younger drivers, except that Alcohol Involvement replaced Unsafe Speed as the second most frequently cited factor. On the other hand, for drivers over 50 years of age, Failure to Yield the Right of Way was the most frequently cited factor among those factors examined, followed by Driving Without Due Care, Weather, Alcohol Involvement, Following too Closely and Vehicle Fault, in that order.

Clearly, while all of the Contributing Factors examined are important in causing casualty accidents, they vary in frequency from age group to age group. Therefore, public education campaigns ought to take these variations into consideration. For example, Unsafe Speed was noted more for the very young drivers than for older drivers, Alcohol Involvement was noted more for young to middle-aged drivers, and Failure to Yield Right of Way was noted most often for drivers over 50 years of age. This is the sort of information that could be used to produce different educational materials "aimed" at each of these driver groups.

Towards Reducing Young Driver Traffic Accidents

This paper discusses the pros and cons of three approaches to reducing young driver traffic accidents: raising the drinking age, curfews for novice drivers, and raising the driving age. It concludes that the practical and political ramifications of these approaches need to be considered further before action is taken.

A Note on the Calculation of Traffic Accident Reduction and Raising the Drinking Age to 21 Years

This paper notes that a 20% reduction in alcohol-related casualty accidents among the 19-20 year old driver group would result in an overall reduction of between about 0.4% to 0.7% in casualty traffic accidents.

VICTIMS OF TRAFFIC ACCIDENTS

Traffic Casualty Types and Locations: Drinking Driver vs Sober Driver Accidents, British Columbia, 1982

In sum, while sober drivers cause about four times the number of casualties as do drinking drivers, the most frequent casualty for both sober-driver and drinking-driver accidents is the driver himself. However, the next most frequently noted source of casualties for sober-driver accidents is persons in other vehicles, while for drinking-driver accidents it is the drinking drivers' passengers. Knowing this, it would seem reasonable to produce a public education campaign which emphasizes the danger of being a passenger with a drinking driver. In addition, resources should be directed toward understanding and reducing the 80% of accidents and casualties not associated with drinking driving.

Passengers in Casualty Traffic Accidents: Drinking Drivers vs Sober Drivers, British Columbia

The drinking driver in casualty accidents, when compared to the sober driver in casualty accidents, is more likely to be male, to be younger, to carry more passengers, to carry passengers more often, and to carry more male passengers. On the other hand, both the drinking driver and the sober driver in these accidents tend to be, on the average, older than their passengers.

Turning to a comparison of male and female drinking drivers in casualty accidents, the female drinking driver is more likely to be carrying passengers, to be carrying more passengers, and to be carrying more female passengers.

Finally, generally the younger the driver in these accidents, the more likely the driver will be carrying a greater number of passengers, lathough this relationship is stronger for male drinking drivers than for male sober drivers.

If one were to roughly characterize the drinking-driving casualty accident from these data, it would involve a young male carrying passengers, two out of three who are male, and all of whom are younger than he.

Pedestrian Casualty Traffic Accident Facts, British Columbia, 1983

* In 1983 there were 1,977 pedestrian casualty accidents resulting in 2,092 casualties. 12% were hit-and-run.

* Two thirds of these casualties were male, and adolescents and young adults made up the bulk of all pedestrian casualties.

* Twenty-four percent of these casualty accidents were caused by pedestrian error, 33% occurred when the pedestrian was crossing with no crosswalk or signal, and about half occurred at intersections.

* Slightly more occurred in Winter, fewer in Summer.

* Fridays and Saturdays produced high numbers of pedestrian casualty accidents, as did all afternoons.

* As one would expect, this is a municipal, as opposed to rural phenomenon. For example, while pedestrian casualty accidents comprised 8.6% of all casualty accidents provincially, they made up 16% of those in the Vancouver area and less than 5% in rural areas.

* Probably because these accidents occur during times of the day when there are relatively few drinking drivers on the roads, relatively few involve a drinking driver.

* Pedestrian casualty accidents will probably increase in relation to other sorts of accidents, and this in turn will probably necessitate a reassessment of police resources and priorities regarding same.

LOCATIONS AND CAUSES OF TRAFFIC ACCIDENTS

Casualty Traffic Accident Locations, British Columbia, 1983

The two types of locations that produced the largest numbers of casualty traffic accidents are at intersections (43%) and between intersections (42%). The former are more urban phenomena, and are most often caused by Failure to Yield the Right of Way, while the latter are more rural and are caused by Driving Without Due Care, Alcohol Involvement, and Speeding, in that order. Because intersection accidents occur at known locations and occur because of specific driving behaviours that are not linked to "lifestyle", they can probably be more easily reduced through law enforcement and public information efforts than can "between intersection" accidents, which occur at more locations and are caused by "lifestyle" and somewhat socially accepted behaviours of drinking driving and driving above the speed limit.

Casualty Traffic Accidents in Vancouver City, Victoria, and North Vancouver, 1983

This paper finds that, like other urban centres, casualty traffic accidents in these areas can be characterized as primarily injury accidents involving other motor vehicles at intersections and are largely due to careless driving and failure to yield the right of way. However, Vancouver City appears to have a high proportion of pedestrian accidents.

Casualty Traffic Accident Causes by Police Reporting Area, British Columbia, 1983

This is a tabular presentation of some of the primary causes of casualty traffic accidents broken down by police reporting detachments.

DRINKING DRIVING ROADCHECK "BLITZES"

The Relationships Among Driving While Impaired Charges, Police Visibility, and Alcohol-Related Casualty Traffic Accidents, British Columbia, December 1977- December, 1982

A longitudinal examination of police visibility, alcohol-related casualty traffic accidents and Driving While Impaired (DWI) charges found that: the frequency of DWI charges related neither to a reduction of alcohol-related casualty traffic accidents nor to the frequency of police drinking-driving roadcheck activities, as measured by vehicles checked by BATmobile teams. On the other hand, police visibility, as measured by BATmobile roadcheck acitivity, related significantly to a reduction of alcohol-related casualty traffic accidents in the month the checks were carried out, and continued to be related to a reduction of these accidents in the following month. An explanation for these relationships is that the potential drinking driver's fear of apprehension is increased by the police presence and thus that driver does not drink and drive, and consequently avoids alcohol-related accidents. Therefore, it is recommended that police resources should be directed toward high visibility roadcheck activities in order to reduce alcohol-related traffic casualties.

An Evaluation of the April-May 1984 Drinking Driving Roadcheck, Enforcement and Media "Blitz"

The April- May 1984 roadcheck, enforcement, and media drinking driving "blitz" co-ordinated by the Police Advisory Committee failed to reduce the number of alcohol-related casualty traffic accidents below levels that would have been expected had there been no blitz. The probable explanation for this is that, due to insufficient media coverage, possibly linked to a Lower Mainland area newspaper strike, the public was not aware of the blitz and therefore did not change their drinking driving behaviours.

RESTRAINT DEVICE USE STUDIES

Trends in Reported Restraint Device Use by Occupants in Injury/Death Traffic Accidents, British Columbia, January 1977- June 1983

Considering occupant restraint device use in casualty traffic accidents reported on the Traffic Accident Report Form (MV104) from January 1977 to June 1983 in British Columbia:

1. The 1977 restraint device legislation was very effective and immediately increased restraint device use by vehicle occupants in casualty accidents to about three and a half times the pre-legislation level.

2. By mid-1979 restraint device use had dropped to about three times the pre-legislation level, but has gradually increased since then to the immediate post-legislation level.

3. Reported restraint device use by occupants in casualty traffic accidents is highest in December-January and lowest in mid-summer, suggesting that the anti-drinking driving media and enforcement campaigns may have a more general effect on traffic safety practices, and that summer campaigns ought to be attempted.

Trends in Restraint Device Use by Young Occupants in Casualty Traffic Accidents, British Columbia, January 1980- September, 1984

The use of restraint devices in motor vehicles has increased substantially between 1980-1984, especially within the younger age groups, as reflected in occupant restraint device use as reported on Traffic Accident Report Forms (MV104) completed by attending police officers at casualty traffic accidents. To illustrate, between 1980-1984, reported restraint device use increased by 70% for the 0-5 year-old group, 57% for the 6-12 year-old group, 36% for the 13-17 year-old group, and 28% overall. From the MV014 casualty accident reports, the use rates in 1980 vs 1984 for these age groups were as follows: 0-5 year-old group, 44% vs 75%; 6-12 year-old group, 47% vs 74%; 13-17 year-old group, 59% vs 80%; and overall 64% vs 82%. Further, in all years and all age categories examined, use rates were highest in Winter months and lowest in Summer months. However, it must be noted that the overall rate of increase appears to be levelling off.

It can be reasonably argued that the increase in rates that began in late 1981 and has continued to date can, in part, be attributed to increased restraint device use law enforcement and "blitzes", to intensive elementary school programs and to inceased public education and awareness campaigns, all assisted by the Traffic Safety Education Department of I.C.B.C. As use rates appear to be lowest in the Summer, perhaps this would be a particularly appropriate time of year for future enforcement and education campaigns. Finally, as the use rates appear to be reaching a plateau, current enforcement and education campaigns must be maintained or even increased.

Restraint Device Use and Ejection From Vehicle

Analyses of restraint device use in casualty traffic accidents in British Columbia for 1982 shows that in 40% of the cases one or more victims were not wearing a restraint device and in about 7% of the cases one or more victims were partially or completely ejected from the vehicle. Regionally, the Lower Mainland showed the fewest of these sorts of accidents, while the Prince George, Prince Rupert, Kelowna and Kamloops RCMP subdivision reporting areas showed the greatest number. The report recommends that enforcement and education resources be allocated to the areas where these accidents occur.

A Note on the Effectiveness of "80% Clicks"

The "80% Clicks" seat belt enforcement and education "blitz" proved effective in reducing casualties below the level that would have been expected without the campaign. The savings in insurance costs amounted to over $1 million within the month following the "blitz".

APPENDIX B

CANADIAN AND B.C. LEGISLATION ON DRINKING-DRIVING

237. Every one commits an offence who operates a motor vehicle or vessel or operates or assists in the operation of an aircraft or has the care or control of a motor vehicle, vessel or aircraft whether it is in motion or not,

(*a*) while his ability to operate the vehicle, vessel or aircraft is impaired by alcohol or a drug; or

(*b*) having consumed alcohol in such a quantity that the concentration thereof in his blood exceeds eighty milligrams of alcohol in one hundred millilitres of blood.

238. (1) In this section and sections 239 to 241,

"analyst" means a person designated by the Attorney General as an analyst for the purposes of section 241;

"approved container" means

(*a*) in respect of breath samples, a container of a kind that is designed to receive a sample of the breath of a person for analysis and is approved as suitable for the purposes of section 241 by order of the Attorney General of Canada, and

(*b*) in respect of blood samples, a container of a kind that is designed to receive a sample of the blood of a person for analysis and is approved as suitable for the purposes of section 241 by order of the Attorney General of Canada;

"approved instrument" means an instrument of a kind that is designed to receive and make an analysis of a sample of the breath of a person in order to measure the concentration of alcohol in the blood of that person and is approved as suitable for the purposes of section 241 by order of the Attorney General of Canada;

"approved screening device" means a device of a kind that is designed to ascertain the presence of alcohol in the blood of a person and that is approved for the purposes of this section by order of the Attorney General of Canada;

"qualified medical practitioner" means a person duly qualified by provincial law to practise medicine;"

"qualified technician" means,

(*a*) in respect of breath samples, a person designated by the Attorney General as being qualified to operate an approved instrument, and

(*b*) in respect of blood samples, any person or person of a class of persons designated by the Attorney General as being qualified to take samples of blood for the purposes of this section and sections 240 and 241.

Canadian Criminal Code Section 238 Continued

(2) Where a peace officer reasonably suspects that a person who is operating a motor vehicle or vessel or operating or assisting in the operation of an aircraft or who has the care or control of a motor vehicle, vessel or aircraft, whether it is in motion or not, has alcohol in his body, he may, by demand made to that person, require him to provide forthwith such a sample of his breath as in the opinion of the peace officer is necessary to enable a proper analysis of his breath to be made by means of an approved screening device and, where necessary, to accompany the peace officer for the purpose of enabling such a sample of his breath to be taken.

(3) Where a peace officer believes on reasonable and probable grounds that a person is committing, or at any time within the preceding two hours has committed, as a result of the consumption of alcohol, an offence under section 237, he may, by demand made to that person forthwith or as soon as practicable, require him to provide then or as soon thereafter as is practicable

(*a*) such samples of his breath as in the opinion of a qualified technician, or

(*b*) where the peace officer has reasonable and probable grounds to believe that, by reason of any physical condition of the person,

(i) the person may be incapable of providing a sample of his breath, or

(ii) it would be impracticable to obtain a sample of his breath,

such samples of his blood, under the conditions referred to in subsection (4), as in the opinion of the qualified medical practitioner or qualified technician taking the samples

are necessary to enable proper analysis to be made in order to determine the concentration, if any, of alcohol in his blood, and to accompany the peace officer for the purpose of enabling such samples to be taken.

(4) Samples of blood may only be taken from a person pursuant to a demand made by a peace officer under subsection (3) if the samples are taken by or under the direction of a qualified medical practitioner and the qualified medical practitioner is satisfied that the taking of such samples would not endanger the life or health of the person.

(5) Every one commits an offence who, without reasonable excuse, fails or refuses to comply with a demand made to him by a peace officer under this section.

(6) Where a person is convicted or discharged under section 662.1 of an offence committed under subsection (5) for a failure or refusal to comply with a demand made under subsection (2) or paragraph (3)(*a*) or (*b*) in respect of any transaction, he shall not be convicted or discharged under section 662.1 of another offence committed under subsection (5) in respect of the same transaction.

239. (1) Every one who commits an offence under section 237 or 238 is guilty of an indictable offence or an offence punishable on summary conviction and is liable,

(*a*) whether the offence is prosecuted by indictment or punishable on summary conviction, to the following minimum punishment, namely,

(i) for a first offence, to a fine of not less than three hundred dollars,

(ii) for a second offence, to imprisonment for not less than fourteen days, and

(iii) for each subsequent offence, to imprisonment for not less than ninety days;

(*b*) where the offence is prosecuted by indictment, to imprisonment for a term not exceeding five years; and

(*c*) where the offence is punishable on summary conviction, to imprisonment for a term not exceeding six months.

(2) Every one who commits an offence under paragraph 237(*a*) and thereby causes bodily harm to any other person is guilty of an indictable offence and is liable to imprisonment for a term not exceeding ten years.

(3) Every one who commits an offence under paragraph 237(*a*) and thereby causes the death of any other person is guilty of an indictable offence and is liable to imprisonment for a term not exceeding fourteen years.

(4) Where a person is convicted of an offence committed under paragraph 237(*a*) or (*b*) or subsection 238(5), he shall, for the purposes of this Act, be deemed to be convicted for a second or subsequent offence, as the case may be, if he has previously been convicted of

(*a*) an offence committed under any of those provisions;

(*b*) an offence under subsection 239(2) or (3); or

(*c*) an offence under section 234, 234.1, 235, 236, 240.1 or 240.2 or subsection 240(4) of this Act as this Act read immediately before the coming into force of this subsection.

(5) Notwithstanding subsection 662.1(1), a court may, instead of convicting a person of an offence committed under section 237, after hearing medical or other evidence, if it considers that the person is in need of curative treatment in relation to his consumption of alcohol or drugs and that it would not be contrary to the public interest, by order direct that the person be discharged under section 662.1 on the conditions prescribed in a probation order, including a condition respecting his attendance for curative treatment in relation to his consumption of alcohol or drugs.

24 hour prohibition

214. (1) In this section "driver" includes a person having the care or control of a motor vehicle on a highway or industrial road whether or not the motor vehicle is in motion.

(2) A peace officer may, at any time or place on a highway or industrial road when he has reason to suspect that the driver of a motor vehicle has consumed alcohol, request the driver to drive the motor vehicle, under the direction of the peace officer, to the nearest place off the travelled portion of the highway or industrial road and there to surrender his driver's licence.

(3) A peace officer may, at any time or place on a highway or industrial road when he believes that a driver's ability to drive a motor vehicle is affected by a drug, other than alcohol, request the driver to drive the motor vehicle, under the direction of the peace officer, to the nearest place off the travelled portion of the highway or industrial road and there to surrender his driver's licence.

(4) Where a peace officer requests a driver to surrender his driver's licence under this section, the driver shall forthwith surrender to the peace officer his driver's licence issued under this Act or any document issued in another jurisdiction that allows him to drive or operate a motor vehicle.

(5) Unless the prohibition from driving a motor vehicle is terminated under subsection (6), (7) or (8), the driver is automatically prohibited from driving a motor vehicle for a period of 24 hours from the time the peace officer requested the surrender of the driver's licence.

(6) Where a driver, who is requested to surrender his driver's licence under subsection (2), forthwith requests a peace officer to administer and does undergo as soon as practicable a test that indicates that his blood alcohol level does not exceed 50 mg of alcohol in 100 mL of blood, the prohibition from driving is terminated.

(7) Where a driver who is requested to surrender his driver's licence under subsection (2) produces, to a peace officer having charge of the matter, a certificate of a medical practitioner that

(a) states that the blood alcohol level of the driver did not exceed 50 mg of alcohol in 100 mL of blood at the time the certificate was signed, and

(b) was signed after he was prohibited from driving,

the prohibition from driving is terminated.

(8) Where a driver, who is requested to surrender his driver's licence under subsection (3), satisfies a peace officer having charge of the matter that his ability to drive a motor vehicle is not affected by a drug, other than alcohol, the prohibition from driving is terminated.

(9) A peace officer acting under subsection (2) need not hold the opinion that the blood alcohol level of the driver exceeds 50 mg of alcohol in 100 mL of blood.

(10) Where a peace officer prohibits a person from driving a motor vehicle under this section, the peace officer shall cause a report of the prohibition to be delivered to the superintendent unless the prohibition from driving a motor vehicle is terminated under subsection (6).

(11) The report referred to in subsection (10) shall be in a form established by the superintendent.

1982-36-32, proclaimed effective September 1, 1982.

Driving with more than 80 milligrams of alcohol in blood

220.1 (1) Everyone who, on a highway or industrial road, drives a motor vehicle or has the care or control of a motor vehicle, whether it is in motion or not, having consumed alcohol in such a quantity that the proportion thereof in his blood exceeds 80 milligrams of alcohol in 100 millilitres of blood, commits an offence and is liable on conviction to a fine of not less than $100 and not more than $2 000 or to imprisonment for not less than 7 days and not more than 6 months, or to both.

(2) A person who is convicted of an offence under subsection (1) is automatically and without notice prohibited from driving a motor vehicle for 6 months as provided under section 92.

1982-73-2, proclaimed effective October 1, 1983."

Demand for blood sample

220.2 (1) Where a peace officer on reasonable and probable grounds believes that a person has,

(a) within the preceding 2 hours, driven a motor vehicle or had the care or control of a motor vehicle on a highway or industrial road, and

(b) consumed alcohol,

he may, by demand made to that person forthwith or as soon as practicable, require him to provide then or as soon thereafter as is practicable a sufficient sample of his blood, as in the opinion of the person taking the sample is necessary, to enable a proper analysis to be made in order to determine the proportion, if any, of alcohol in his blood, and to accompany the peace officer for the purpose of enabling that sample to be taken.

(2) Where the person referred to in subsection (1) is incapable, due to physical or mental trauma, of comprehending the nature of a demand under subsection (1), a sufficient sample of his blood, as in the opinion of the person taking the sample is necessary, to enable a proper analysis to be made in order to determine the proportion, if any, of alcohol in his blood, may be taken from that person without a demand being made under subsection (1).

(3) A blood sample may be taken under this section only by a person or class of persons approved by order of the Attorney General, a medical practitioner or a registered nurse within the meaning of the *Nurses (Registered) Act*.

(4) A blood sample taken under this section may only be analyzed by a person or class of persons approved by order of the Attorney General using a method approved as suitable for the purposes of this section by order of the Attorney General.

1982-73-2, proclaimed effective October 1, 1983.

Refusal to give blood sample

220.3 (1) A person who without reasonable excuse fails or refuses to comply with a demand made under section 220.2 (1) commits an offence and is liable on conviction to a fine of not less than $100 and not more than $2 000 or to imprisonment for not less than 7 days and not more than 6 months, or to both.

(2) A person who is convicted of an offence under subsection (1) is automatically and without notice prohibited from driving a motor vehicle for 6 months as provided under section 92.

1982-73-2, proclaimed effective October 1, 1983.

Proof of blood sample

220.4 (1) In a proceeding under section 220.1, where a blood sample of the defendant was taken

(a) pursuant to a demand made under section 220.2 (1) or pursuant to section 220.2 (2), and

(b) as soon as practicable after the time when the offence was alleged to have been committed and in any event no later than 2 hours after that time,

evidence of the result of an analysis of the blood sample is, in the absence of any evidence to the contrary, proof of the proportion of alcohol in the blood of the defendant at the time when the offence was alleged to have been committed.

(2) In a proceeding under section 220.1, where a blood sample of the defendant was taken pursuant to a demand made under section 220.2 (1) or pursuant to section 220.2 (2), a certificate of a person referred to in section 220.2 (3) or (4) stating that he has

(a) taken the blood sample of the defendant, or

(b) made an analysis of the blood sample of the defendant and stating the result of his analysis

is evidence of the statements contained in the certificate without proof of the signature of the person appearing to have signed the certificate.

(3) In a proceeding under section 220.1, where a blood sample of the defendant was taken pursuant to section 220.2 (2), a certificate of a medical practitioner stating that, in his opinion, at the time the blood sample was taken the defendant was incapable, due to physical or mental trauma, of comprehending the nature of a demand under section 220.2 (1) is evidence of the statements contained in the certificate without proof of the signature of the person appearing to have signed the certificate.

(4) In a proceeding under section 220.1, where a blood sample of the defendant was taken pursuant to a demand made under section 220.2 (1) or pursuant to section 220.2 (2), the proportion of alcohol in the blood sample of the defendant at the time of the analysis shall be deemed to be the same as the proportion of alcohol in the blood of the defendant when the sample was taken, unless the defendant proves otherwise.

(5) A defendant against whom a certificate described in subsection (2) or (3) is produced may, with leave of the court, require the attendance of the person who made the certificate for the purposes of cross examination.

(6) No certificate shall be received in evidence pursuant to subsection (2) or (3) unless, before the trial, the defendant has received reasonable notice that the certificate will be introduced and has received a copy of the certificate.

(7) The Lieutenant Governor in Council may prescribe the form and content of certificates to be used in this section.

1982-73-2, proclaimed effective October 1, 1983.

Civil liability

220.5 No action lies, for damages or otherwise, against any person as a result of the taking or analyzing of a blood sample under section 220.2 except an action for damages arising out of negligence in technical procedures used in taking the blood.

1982-73-2, proclaimed effective October 1, 1983.

No legal obligation

220.6 Notwithstanding anything in sections 220.1 to 220.5, a person authorized to take a blood sample under section 220.2 (3) may decline to take a blood sample from a person where to do so would, in the opinion of a medical practitioner, endanger that person's health or life.

1982-73-2, proclaimed effective October 1, 1983.

Prohibition against driving by court

90. (1) For the purpose of this section, "convicts" includes the granting of an absolute or conditional discharge.

(2) Where a court convicts a person of an offence under

(a) this Act or the regulations,

(b) section 233, 234, 235 or 236 of the *Criminal Code*, or

(c) section 203, 204 or 219 of the *Criminal Code* where the section was contravened by means of a motor vehicle,

the court may

(d) consider the person's driving record, and

(e) notwithstanding that the person is or may be subject to another prohibition from driving, prohibit the person from driving a motor vehicle for a definite period of time if the court considers that the facts of the case or the person's driving record or both the facts of the case and his driving record when taken together justify the prohibition.

(3) Subsection (2) does not apply

(a) where neither the defendant nor his agent or counsel appears before the court at the time of conviction, or

(b) where the defendant is convicted of an offence under section 76.

(4) Where a court prohibits a person from driving a motor vehicle under this section, the court shall order that the prohibition

(a) take effect immediately,

(b) continue for the full day of each day of the prohibition, and

(c) continue for consecutive days.

(5) A person, who is prohibited from driving a motor vehicle under this section for a period of more than 3 years, may make an application to the court that prohibited him from driving for a review of the length of the prohibition, after 3 years of the prohibition have elapsed and after notifying the superintendent.

(6) On an application under subsection (5), the court may, where it considers that it is not contrary to public interest, reduce the length of the prohibition or cancel the prohibition.

(7) Where the court reduces the length of a prohibition or cancels a prohibition under subsection (6), it shall forthwith notify the superintendent of its decision.

1982-36-19, proclaimed effective September 1, 1982; 1984-30-51, effective June 11, 1984 (B.C. Reg. 165/84); *[amended 1985-52-59, not in force, amendment not included]*.

91. [Repealed 1982-36-19, proclaimed effective September 1, 1982.] [Re-enacted 1982-36-19, to be proclaimed.]

Automatic prohibition against driving on conviction

92. (1) For the purpose of this section, "convicted" includes the granting of an absolute or conditional discharge.

(2) A person who is convicted of an offence under

(a) section 88, 94, 220.1 (1) or 220.3 (1),

(b) section 233, 234, 235 or 236 of the *Criminal Code*, or

(c) section 203, 204 or 219 of the *Criminal Code* where the section was contravened by means of a motor vehicle

is automatically and without notice prohibited from driving a motor vehicle for 6 months from the date of sentencing, the date that the passing of sentence is suspended, the date of being granted an absolute or conditional discharge or the date a court makes a disposition under the *Young Offenders Act* (Canada) or the *Young Offenders (British Columbia) Act*.

(3) Subsection (2) does not apply where neither the defendant nor his agent or counsel appear before the court at the time of conviction.

1982-36-19, proclaimed effective September 1, 1982; 1982-73-1, proclaimed effective October 1, 1983; 1984-30-52,53, effective June 11, 1984 (B.C. Reg. 165/84); *[amended 1985-52-60, not in force, amendment not included]*.